

NETWORK WORLD

The Newsweekly of User Networking Strategies

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Racal unit unites rival LAN worlds

By Laura DiDio
Senior Editor

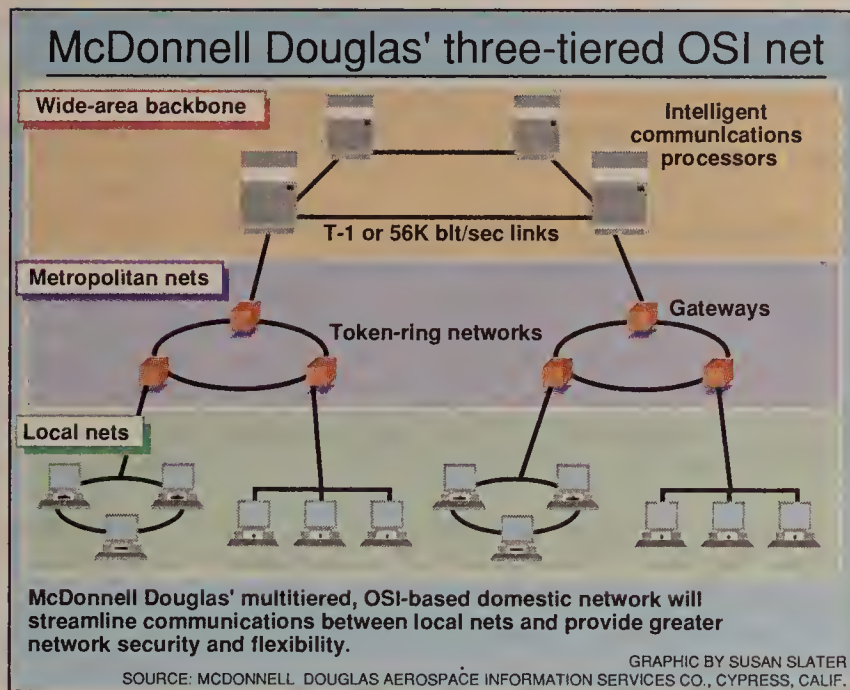
BOXBOROUGH, Mass. — Racal InterLan last week beat other vendors to market with a product that integrates Novell, Inc.'s NetWare and OS/2 LAN Manager environments.

LMN Server will enable NetWare users to access LAN Manager servers as if they were NetWare servers. Workstations in LAN Manager environments initially will only be able to copy files from NetWare servers.

Racal InterLan said the software, which runs on an OS/2 LAN Manager server, is available now. By contrast, Novell last month announced plans to forge a link between NetWare and LAN Manager by supporting the Named Pipes programming interface. The company will not ship its NetWare Requester for OS/2 until the first quarter of 1990 ("Software lets Novell users support OS/2 applications," *NW*, July 31).

Jim Fennessey, director of information systems and services at Johns Hopkins University's School of Public Health in Baltimore, a beta user of LMN Server, said this type of product is becoming a necessity for organizations with heterogeneous nets.

"Short-term, I can support
(continued on page 57)



McDonnell Douglas builds hierarchical OSI network

New architecture promises to reduce number of data links between sites, improve net security.

By Wayne Eckerson
Staff Writer

CYPRESS, Calif. — In an effort to streamline internal communications, McDonnell Douglas Corp. has begun building a three-tiered domestic network based on Open Systems Interconnection standards.

The new hierarchical architecture is expected to increase network flexibility, reduce the number of data links between company sites and improve network security, according to Lionel Gillerman, manager of network technology at the aerospace company.

The network, which is scheduled for completion next year, will replace a tangled web of circuits that is becoming increasingly unmanageable as users connect with a growing number of local networks, according to Gillerman.

"If we hadn't done something soon, we would have had a mish-mash of circuits, networks, protocols and hardware akin to a Tower of Babel," he said.

The architecture will feature a wide-area backbone network interconnecting a series of metropolitan networks and scores of
(continued on page 60)

IBM refines NetView, closes Siemens deal

NetView gets graphic interface, PBX links.

By Paul Desmond
Senior Writer

NEW YORK — IBM last week teamed up with other vendors to expand its line of NetView-related products, adding a long-awaited graphical user interface and support for a wider range of private branch exchanges.

IBM said at a press conference here that it acquired a graphical user interface developed by US West Network Systems, Inc. (NSI). IBM also announced it will comarket third-party NetView/PC application development software and a NetView/PC-based package that forwards alarms to NetView from a range of PBXs.

In addition, IBM expanded its customer network support program to include network design, construction and operation. Previously, IBM would assume responsibility only for problem tracking and resolution, said Ellen Hancock, vice-president and general manager of IBM's Communications Systems division.

Users and analysts were split on IBM's third-party NetView alliances. Some said the announcements indicate that IBM's internal development is stalled, but others applauded the company for seeking help to make needed
(continued on page 58)

IBM outlines plans to merge 9751, Saturn.

By Bob Wallace
Senior Editor

NEW YORK — IBM and Siemens AG last week finalized their Rolm PBX partnership and outlined their product strategy and distribution plans.

The consummation of the alliance, originally announced last December, capped eight months of user uncertainty and confusion during which IBM and Siemens said many of their customers halted or delayed private branch exchange purchase decisions.

The signing of the deal comes just one week after IBM introduced a series of products and enhancements for its flagship 9751 PBX line. The announcements included enhanced switch software and a new low-end model of the 9751, as well as new T-1 and Inte-
(continued on page 6)

User weighs 3+Open for LAN venture

By Paul Desmond
Senior Writer

DANBURY, Conn. — A task force within Union Carbide Industrial Gases, Inc. has recommended that the company adopt 3Com Corp.'s 3+Open LAN Manager as the foundation for a major local network project.

Although details of the project are still being finalized, the company plans to install nearly 20 token-ring networks based on LAN Manager to support some 1,200 workstations at several sites. The nets will be linked to a corporate-wide X.25 backbone.

The local net operating system was recommended because it will allow Union Carbide Industrial Gases to build client/server-type applications that distribute processing between workstations and servers, said Bryce Morgan, manager of communications.

3+Open also fits in with the company's plan to migrate toward Open Systems Interconnection net standards. Version 1.1 of
(continued on page 9)

NETLINE



USERS FEAR LABOR strikes against four RBHCs could thwart major networking projects. Page 2.

ASHTON-TATE'S dBase IV program for SQL Server is delayed again, and company finances grow worse. Page 2.

USERS SHIFT EDI TRAFFIC to private nets as they become

more dependent on trading electronically. Page 4.

UNDERSEA CABLE OUTAGES have users questioning cable reliability and rethinking international net strategies. Page 5.

HP'S DAN WARMENHOVEN discusses his company's role in today's networking market. Page 41.

FEATURE

HP: pilgrimage to profits on rocky, 'open' road

By Bruce Guptill
Features Writer

In a world of conflicting connectivity theologies, Hewlett-Packard Co. has chosen to follow the prophets — and profits — of the Open Systems Interconnection model.

The company was among the first to embrace the philosophy of openness; it announced support for OSI in 1985. At that time, migration of its product development from proprietary operating and processing sys-
(continued on page 32)



Users fear project delays as RBHC strikes continue

Bell Atlantic and union iron out agreement, but CWA members still off the job at four RBHCs.

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — Network users last week voiced growing concern that labor strikes against four regional Bell holding companies will derail major network projects, such as the federal government's Federal Telecommunications System (FTS) 2000 network.

At press time, the Communications Workers of America (CWA) continued its strike against Nynex Corp., Pacific Telesis Group and Ameritech. Late Thursday, Bell Atlantic Corp. reached a tentative settlement with union members, raising hopes the strike may end in that region by early this week.

Union negotiators for Bell Atlantic workers agreed to a three-year wage increase of 10.26%, along with the establishment of a profit-sharing plan for nonmanagement employees.

Pacific Telesis seemed optimistic that a settlement is near and said "substantial progress" was made last week. US West, Inc. and Southwestern Bell Corp. last week reached tentative agreements with its CWA workers and averted walkouts. Union bargaining committees have endorsed

the tentative agreements and expect rank and file members to ratify the contracts.

Talks between Nynex and the CWA broke off after only about three hours due to an impasse on health care benefit costs. Ameritech, the latest RBHC to be hit by a strike, held no talks last week with workers who left their jobs Aug. 13.

The International Brotherhood of Electrical Workers (IBEW), whose contracts expired at the same time as many of the CWA workers, settled its disputes with Pacific Telesis and Ameritech, but was still on strike against Nynex and Bell Atlantic. Bell Atlantic said it hopes to hammer out a settlement with the IBEW based on the CWA deal.

At press time, about 200,000 union technicians, linemen, operators and others were estimated to be on strike.

Outside of isolated incidents of vandalism, network service was not disrupted because of the highly automated systems that are in use.

An official at the General Services Administration last week said the government body is monitoring the strike on a daily basis.

(continued on page 58)

Ashton-Tate plans layoffs, delays dBase IV shipment

Company won't estimate software ship date.

By Susan Breidenbach
West Coast Bureau Chief

TORRANCE, Calif. — Ashton-Tate Corp. last week warned the investment community that its financial condition is worsening and announced plans to cut its work force by at least 15% and reduce other operating expenses.

In addition, the company acknowledged that its forthcoming dBase IV 1.1, the long-awaited front-end application for SQL Server, will be delayed yet again, this time beyond the most recent Sept. 30 shipment date. The company would not say when the product will ship.

Ashton-Tate also confirmed reports that the product will be offered in two versions: one with an interface to the SQL Server being marketed by Ashton-Tate and Microsoft Corp., and one without. The latter version will be released first. SQL Server is a server-based data base management system that handles requests for data from workstation-based applications.

Financial analysts said the pending layoffs and general belt

tightening were not unexpected, given continuing softness in Ashton-Tate's sales. They applauded the company's decision to get a version of dBase IV 1.1 out as quickly as possible, with or without an SQL Server connection.

"To the installed base of dBase users, [the SQL connection] is not terribly important," said Bahar Gidwani, a vice-president and software analyst for Kidder, Peabody & Co. "Going forward, it will be increasingly important. SQL Server is turning out to be a good product."

Dreary Monday

Ashton-Tate alerted the financial community on Monday that losses for its 1989 third quarter, ending Sept. 30, may exceed the \$19.8 million loss incurred in the previous quarter, ended June 30. It will be the company's third straight quarter of losses.

The news sent the company's already battered stock, which has lost nearly half of its value since the beginning of the year, down to a new 52-week low of \$12.75

(continued on page 7)

Briefs

Taxing crime. U.S. attorneys last week charged a Boston-area bookkeeper with filing \$325,000 in fraudulent tax refund claims by using the Internal Revenue Service's Electronic Filing System. The IRS said the computer age has "spawned a new breed of criminal" and the bookkeeper's arrest was only the tip of the iceberg in an ongoing investigation that revealed the refund scheme has reached nationwide proportions. The bookkeeper, who allegedly filed 45 fraudulent returns, faces up to five years in prison and up to \$250,000 in fines for each count that results in a conviction.

GE buys video net gear. General Electric Co. last week agreed to purchase \$4.5 million worth of videoconferencing equipment from Compression Labs, Inc. of San Jose, Calif. The equipment will be installed in GE locations in the U.S. and Europe over a three-year period. GE will use it for executive meetings and engineering projects, and to communicate with customers and suppliers.

Incentives for price cuts. California regulators last week recommended a new incentive plan that would give Pacific Telesis Group and GTE Corp. the opportunity to make higher profits if they boost productivity by 4% a year.

The California Public Utility Commission staff's proposed order would let the two carriers cut some prices to meet competition, and it specifies price caps for monopoly services. The plan is intended to provide incentives for improving efficiencies, service and profits.

Retailer gives MCI the business. Montgomery Ward & Co. last week awarded a three-year contract to MCI Communications Corp. for a virtual private network linking the company's headquarters to 420 retailer locations nationwide. The retailer expects to save \$1 million annually. MCI will provide Customer Information Manager service, which will enable Montgomery Ward to review and change network features without assistance from MCI.

Power play. The Electric Power Research Institute (EPRI) last week began Phase 2 of its ongoing project to develop an Open Systems Interconnection-based communications architecture tailored to meet the needs of electric utilities. EPRI and Andersen Consulting, a division of Arthur Andersen and Co., contracted to develop the Utilities Communications Architecture (UCA). They will set up shop for the next six months at two host utilities — Pacific Gas and Electric Co. in San Francisco and Houston Lighting and Power Co.

Appealing pursuit. Home Shopping Network, Inc. (HSN) last week formally appealed the verdict in its failed \$1.5 billion suit against GTE Corp. and appealed GTE's successful \$100 million countersuit ("HSN loses \$1.5b GTE suit, must pay \$100m damages," *NW*, Aug 7). In the appeal, HSN is arguing that inaccurate testimony prejudiced the jury, that HSN was improperly barred from submitting crucial evidence and that GTE failed to prove harm commensurate with damages levied in the countersuit.

CONTENTS

Industry Update

U.S. District Court Judge Harold Greene's decision to indefinitely postpone the next triennial review of the Modified Final Judgment may have the RBHCs fuming, but users don't see the move as a setback for the telecommunications industry. **Page 11**

Telecommunications

The extended superframe format, a T-1 framing format that enables users and carriers to monitor and manage circuit performance better than older schemes, has won wide acclaim. **Page 15**

Data Communications

A \$6 billion-per-year retailer that supports military post exchanges is embarking on a network mission that promises to save \$5m per year by automating ordering and financial reporting. **Page 19**

Local Networking

Members of the fledgling New England Academic and Research network and two vendors have developed a way to double the reach of a single microwave span used to link remote Ethernets. **Page 21**

Management Strategies

Although management at the law firm of Buchalter, Nemer, Fields and Younger thought a local network would be ideal to support the micros that were spreading throughout the company, they were wary of the complexity of net operating systems. **Page 25**

Products & Services

Account-A-Call expanded its Telephone Accounting Data Poll line by adding a version that can be used with Centrex. **Page 27**

Inside

Opinions **30**
Letters **31**
Networking Marketplace **50**
Calendar **60**

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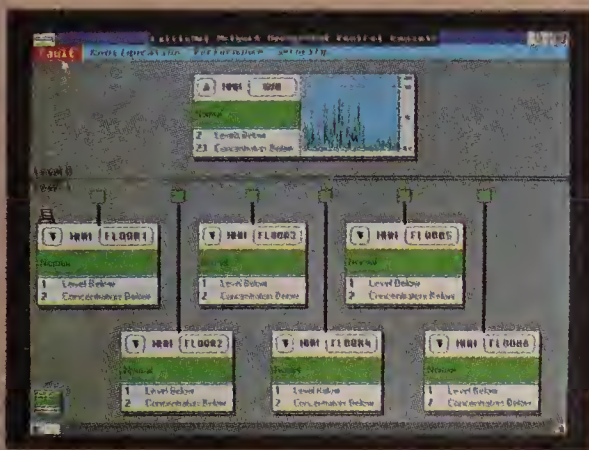
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Users shifting more EDI traffic from third-party to private nets

By Bob Brown
Senior Editor

As their reliance on electronic data interchange grows, large users say they are shifting EDI traffic from third-party networks to private facilities.

Early users found value-added EDI services to be cost-effective for low-volume usage and service providers helpful in establishing EDI links with trading partners.

But increasing reliance on the electronic exchange of business documents is making private EDI networks a viable option for more and more users, and large compa-

nies have developed the in-house expertise needed to establish EDI partnerships.

In addition, some large users want more control over EDI links with critical trading partners.

Looking into the future

Texas Instruments, Inc. in Dallas, which is recognized for its leadership in EDI, is one company that foresees EDI traffic shifting away from third-party networks ("Texas Instruments wins title of EDI user of year," *NW*, Aug. 14).

The company is establishing direct

links to high-volume trading partners, according to John White, senior vice-president for TI's Information Systems & Services group. "I see users moving more traffic to dedicated lines," White said.

About 60% of TI's existing EDI traffic is supported by eight different third-party networks, but White said he expects that amount to shrink to about 20% in the next few years. TI will continue to develop its internal EDI staff and organization, enabling the company to maintain direct links with its major trading partners, he said.

TI's EDI organization has responsibility for designing EDI software and helping other firms come on-line as electronic trading partners.

Another large EDI user, E.I. du Pont de Nemours & Co. in Wilmington, Del., also

expects its use of third-party EDI networks to drop over the next five years.

Direct links where necessary

"We don't have a philosophy that we have to push all our EDI traffic onto dedicated lines," said Ken Hutcheson, EDI supervisor for du Pont. "But we will use direct connections for EDI transactions with our strategic partners [such as financial institutions], where we can't afford transmission problems, and our high-volume trading partners."

About 90% of du Pont's EDI traffic is carried over third-party network links, but this figure will shrink to 70% in five years, Hutcheson estimated.

"I believe we're at the point where third-party services have become com-
(continued on page 8)

US Sprint offers PC-based billing control system

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — US Sprint Communications Co. last week unveiled billing management software for personal computers that it says will enable users to reduce the delay and expense of analyzing monthly telephone bills.

The Fonview software is a menu-driven program that allows users to analyze monthly bills sent to customers on a floppy disk. Bills can be analyzed according to a number of variables, including departments, specific user, point of origin, range of calls, time of day and peak traffic times, according to Lawrence Lake, senior vice-president of product management at US Sprint.

Previously, users either had to pay an additional fee for customized monthly bills or do the analysis themselves on a mainframe to receive this type of information.

Fonview is compatible with standard business software packages, allowing users to export billing information to programs such as Lotus Development Corp.'s Lotus 1-2-3 spreadsheet or Ashton-Tate Corp.'s dBase II.

US Sprint said Fonview will reduce the delay and expense of analyzing bills delivered on either of the current media — paper or magnetic tape.

The floppy disks are sent to users five days after the carrier's billing cycle closes, compared to about 30 days for the delivery of magnetic tapes.

Company officials also said they are considering downloading billing information directly to personal computers or providing it on optical disks in the future.

Industry analysts and consultants said the product will be beneficial to small and midsize companies, but they were divided on its usefulness for large corporations, which generally have billing management systems.

Fonview, which is scheduled for general release early in the fourth quarter, has a onetime charge of \$50 per software package, as well as monthly charges of \$25 for low-volume services such as Dial 1 and Dial 1 WATS and \$100 for high-volume services such as 800 and Ultra WATS.

The modest price of the system will be one of its biggest selling points, according
(continued on page 7)

A few suggestions for with another international

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Problems plaguing undersea fiber links raise concern among users

Fiber-optic links to Europe, Far East suffer service setbacks.

By Barton Crockett
Senior Editor

Major outages hampering operations of the country's first two undersea fiber-optic cables have users questioning the reliability of those systems.

At press time, both major undersea fiber cables serving the U.S. were impaired. One, Trans-Pacific Cable-3/Hawaii-4 (TPC-3), which runs from California to Japan and the Philippines, has been out of commission since July 17 due to an

electrical problem in a repeater 18,000 feet underwater, 2,500 miles west of Honolulu.

And the French leg of the Trans-Atlantic Telecommunications-8 (TAT-8) cable, which runs from New Jersey to the U.K. and France, has been out of commission since early last week because of damage inflicted by a fishing vessel.

The TPC-3 disruption has kept the 4-month-old cable out of service for nearly a month. AT&T officials said the cable

should have been fixed by last weekend, assuming nearby typhoons did not cause problems for two repair boats at the scene.

The current TAT-8 outage marks the third time hook-laden fishing nets have debilitated the French leg of that cable since it was cut over last December.

Because TAT-8 branches into two segments off the coast of Europe — one branch feeding the U.K. and the other extending to France — difficulties with the French portion of the cable have not affected the U.S.-to-U.K. link.

However, operations on the entire cable ground to a halt for about a week last March when an electrical problem knocked out the British leg two days after a fishing vessel cut the French segment.

Several users said the string of outages has diminished their faith in the reliability

of undersea fiber cables, caused them to change their network plans and even cost them money.

Frustrated users

Reporting losses because of the outages was Daniel McFarland, vice-president and division manager of network services for Los Angeles-based Security Pacific Automation Co., Inc.

McFarland said his company planned to cut over a 64K bit/sec circuit on TPC-3 on July 17, the day of the outage. That circuit would have carried compressed voice traffic for the firm's parent company, Security Pacific Corp.

While satellite backup service has been provided for TPC-3 users, McFarland said his company did not receive it because his line was not up and running.

The result? Security Pacific has yet to reap the \$10,000 to \$12,000 a month savings it expected to receive by using the 64K bit/sec circuit instead of international dial-up service.

Jeff Marshall, managing director of communications at New York brokerage Bear Stearns & Co., Inc., said his company modified its network plans because of the repeated outages on the French leg of TAT-8. Marshall said that before the problems arose he was planning to run a T-1 from New York to Bear Stearns' offices in France.

But after several problems on TAT-8's French segment, Marshall said the company abandoned plans to run the T-1 line directly to France and early this summer decided to route the circuit to the U.K. instead. From there, Bear Stearns' traffic will be carried to France over the firm's own European private net, Marshall said.

William Coopman, manager of telecommunications at Moline, Ill.-based

(continued on page 57)

those who decide to go long distance company.

Members of COS split on impact of staff cutbacks

By Gail Runnoe
Washington Correspondent

MCLEAN, Va. — Members of the Corporation for Open Systems International (COS) last week voiced differing opinions on whether recent cost-cutting moves will exacerbate problems with delivery of conformance testing tools.

COS cut its staff by 40% earlier this month due to slow sales of its conformance testing products ("COS trims staff 40%, refines focus," *NW*, Aug. 14).

But Andy De Mari, chairman and chief executive officer of Retix and a member of COS' board of directors, said the group's revenue problems stem from the fact that it has not delivered a full range of needed conformance test tools — particularly for the COS Mark program.

"Right now, you can only get [COS Mark tools] for 802.4 [token bus] products," De Mari said. "That's an extremely limited market. People are eagerly waiting for 802.3 [Ethernet], X.400 and X.25 tools."

The COS Mark program — which certifies product conformance to Open Systems Interconnection standards — is continually going through delays, De Mari said, and laying off part of the technical staff "does not accelerate things."

(continued on page 8)

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IBM plans to merge 9751, Saturn

continued from page 1

grated Services Digital Network interfaces.

Two weeks ago, "we announced . . . new Rolm products that [use] Siemens' ISDN technology," said Mitchell Watson, Rolm Co.'s chief executive officer. "That announcement was testimony that the partnership between IBM and Siemens worked."

But, according to Ian Angus, president of Angus TeleManagement Group, Inc., a consulting firm in Pickering, Ontario, Rolm isn't out of the woods yet. "Rolm has to prove to its customers it can function as an effective PBX sales and marketing organization, provide a high level of service and support, and deliver new

products and services," he said.

The IBM-Siemens deal established Rolm Systems, a wholly owned subsidiary of Siemens AG that will handle development and manufacturing of PBXs and related products.

Headquartered in Santa Clara, Calif., Rolm Systems, which employs 5,500, will handle development and manufacturing operations. The factories that were used to manufacture IBM/Rolm

PBXs will now manufacture Siemens switches as well.

The agreement also created Rolm Co., a joint venture of IBM and Siemens that will handle the marketing and service of Rolm Systems' products and provide service to current domestic Rolm customers. Rolm Co. is equally owned by Siemens and IBM.

The deal signed last week created a new oversight committee — a group that gives IBM some

control over products developed by Rolm Systems — that was not part of the original agreement.

The two vendors created a six-person committee, called the Joint Technical Operations Committee (JTOC), that consists of three top officials from IBM and three from Siemens. The committee will direct IBM and Siemens efforts to develop advanced voice/data products for customers in the U.S. and Europe.

"The [JTOC] will ensure that PBXs developed by Rolm Systems and host products developed by IBM will work [together]," said Ellen Hancock, vice-president and general manager of IBM's Communications Systems division.

Tel Plus Communications, Inc., one of the nation's largest telecommunications equipment distributors, which was bought by Siemens in 1987, will remain a wholly owned subsidiary of the West German firm and will market Siemens' Saturn and key telephone systems.

IBM and Siemens' long-term PBX product strategy calls for the merging of the IBM/Rolm 9751 with the Saturn PBX. Officials said the two PBXs will be merged over the next several years to run on a single platform, but they declined to say when they expect to complete the project.

"What we are trying to do with the products as we move through time is converge the subsystems, eliminating duplicate development wherever [possible]," Watson said. "The subsystems will become common, and customers around the world will use a single unified platform."

Meanwhile, Siemens will support two separate product lines: the 9751, which supports 50 to 20,000 lines; and the Saturn mid-range PBX, which can support as many as 894 lines.

"We both took a look at our [respective] customer bases and decided there was no way to do away with one of them. We have to go along with two product lines," said Peter Pribilla, executive vice-president of Siemens AG's Private Communications Systems and Networks group.

Siemens ended years of speculation that the firm would bring the high-end version of its Hicom switch to the U.S. "It's certainly not our intention to bring the [large] Hicom into the U.S. market," a Siemens spokeswoman said. The switch maker primarily sells the Hicom in West Germany.

Although IBM and Siemens said they didn't lose any customers in the eight months since the Rolm deal was announced, both companies said user uncertainty made many of their customers skittish. "Both Mitchell and I have talked to customers who said they have Rolm PBX contracts on their desk and that they would sign contracts with Rolm once we signed our agreement with Siemens," Hancock said.

"If I were a customer, I'd do the same thing," Pribilla said. **Z**

NETWORK-MANAGED



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Ashton-Tate plans layoffs

continued from page 2

per share on Wednesday.

In addition to the layoffs, Ashton-Tate is cutting travel, advertising and promotional expenses, and reviewing ongoing projects to determine which ones to terminate. The company employs more than 1,700 people.

Company Chairman and Chief Executive Officer Edward Esber said he is taking charge of Ashton-Tate's critical Database Division, which accounts for about 70% of the company's revenue. Esber assumed the responsibilities of president and CEO when Luther Nussbaum resigned from those positions last month during a management dispute.

Gidwani approved Esber's assumption of additional control. Gidwani's firm issued a strong buy recommendation on Ashton-Tate's stock last week, and he views the company as a possible takeover target.

"They are certainly strengthening their leadership, but they haven't yet shown that they can execute," Gidwani said. "If they are unable to execute, I think the company will have to be sold."

Esber said the two-phase release of dBase IV 1.1 will enable the company to get at least one

version of the product into users' hands sooner. The SQL Server interface is taking much longer to complete than Ashton-Tate anticipated, and sources close to the development work say the release of the Server Edition could be as late as next spring.

Eric Kim, vice-president of Ashton-Tate's Database Division, said the version without the SQL Server connection has already been tested extensively by a small group of "power users" who belong to the company's 16-member dBase Language Advisory Board (dLAB). These users were

instrumental in persuading Ashton-Tate to release dBase IV 1.1 without waiting for the SQL Server interface.

Teresa Lotzgesell, a financial analyst for Ragen MacKenzie, Inc. in Seattle, said Ashton-Tate's SQL Server partner, Microsoft, "is probably not too happy" with the additional delay of what was intended as the premier front-end application to the product.

Robert Faulkner, a research analyst with Alex. Brown & Sons, Inc. in New York, said the value of having a dBase front end to SQL Server is "more psychological

than anything else right now. Since Ashton-Tate is marketing the server, there is the notion that they should have been first with a front end to it."

Also, he said, SQL Server — released last April — is in a critical evaluation stage right now, and front-end applications that aren't available for evaluation are in danger of missing the boat.

"The harvest is probably six to nine months down the road," Faulkner said, "but unless you plant your seeds today, you are not necessarily going to harvest anything." □

US Sprint offers billing system

continued from page 4

to Robert Hardy, president of Compucon Communications Corp., a telecommunications service bureau in Indianapolis that developed Fonview for US Sprint.

Hardy said billing management packages similar to Fonview cost \$5,000. He said the package is a customized personal computer version of Smartbill, a mainframe billing management system developed by Compucon.

Jim Dodd, director of WATS product management at US Sprint, agreed that cost savings will be an important benefit for users. He said a customer he

talked to estimated his company spent \$20,000 to develop its own billing management package.

According to Paul Kirvan, an independent consultant based in Turnersville, N.J., "Large users may want to check Fonview out, if for no other reason than because it's so cheap." Kirvan estimates it would take two to three staff programmers about six months to develop a billing management system from scratch.

Bob Self, founder and owner of Market Dynamics, a New York consulting firm, agreed that Fonview may be most popular with

small to midsize businesses but sees a place for the product among large users. A user's internal billing system often registers calls that were attempted but not completed. "Quite often, a billing system on premises can be [above or below] the carrier's charges by 10%," Self said.

Joaquin Gonzales, an analyst with Network Strategies, a consulting practice of Ernst & Young in Fairfax, Va., said Fonview will be popular with big corporate users. He said large users are moving away from centralized management of billing, so a personal computer-based product that could be placed at remote locations should be popular. □

A matter of life and death for your LAN.

Users shifting EDI traffic

continued from page 4

modity offerings," Hutcheson said. "I still think they'll play an important role for us, but we don't need all the bells and whistles."

According to Howard Anderson, president of The Yankee Group, a Boston-based market research firm, a growing number of EDI users are graduating from third-party networks to dedicated links.

"We can see 50% of large users' traffic moving from third-party networks to direct links within three years," said Anderson, whose firm recently hosted "Third Generation EDI," a seminar for EDI users and vendors. "That's the [third-party vendors'] most profitable 50% — the largest volume users — going direct."

Use of private lines

The emergence of messaging standards has encouraged large users to switch EDI traffic to private lines, according to Torrey Byles, a consultant at Input, a research firm in Mountain View, Calif. Users no longer need to rely as much on third-party nets to translate trading partners' various document formats now that

EDI standards such as ANSI X12 are coming into wider acceptance, he said.

Vendors not worried

EDI service providers acknowledge they will lose business from some large users, but they say their overall business will stay strong thanks to continuing overall market growth from the influx of many new small and midsize EDI users.

The vendors also expressed confidence that many large users will rather use a third party to help set up new EDI trading partners than hire a new staff.

As EDI technology becomes more affordable and easy to use, a new generation of EDI users will emerge and provide third-party net vendors with plenty of business, predicted Gary Dalton, AT&T's EDI business manager.

"It makes sense in certain cases for users to use direct connections for EDI, but that is not the answer for everybody," Dalton said. "While a lot of Fortune 1,000 companies have the equipment to handle high volumes of EDI traffic, there is still a big role in managing the connections."

Not all users want to be in the business of training their many potential EDI trading partners to conduct EDI transactions, he said. **■**

Members of COS split on cuts

continued from page 5

Rodney Sandel, vice-president of sales and marketing at COS, admitted that delivery dates for 802.3, X.400 and X.25 tool sets had been pushed back after the group realized that development would take longer than expected.

Sandel acknowledged that delivery dates could be pushed back a few more weeks because of the recent layoffs, but he added that COS' engineering group has seen the smallest reduction in staff.

"We're trying to evaluate the net effect [of the reduction] on product and service delivery," Sandel said. "We don't anticipate any long slippages."

COS currently expects to have its X.25 conformance testing system for OSI Layers 2 and 3 available by the end of this month. The testing system for Layer 1, originally slated to be out next month, is now scheduled to be delivered in December, Sandel said.

Conformance tests for X.400 were due out last month but now are not expected until September; tools for 802.3 testing, originally scheduled to be out this December, are not expected to be released until the third quarter of 1990.

James Cornelius, vice-presi-

dent of network evolution planning at Bell Communications Research and vice-chairman of COS, said he felt delays have only been minimal and were at times beyond COS' control.

"In some cases, tool sets were based on implementors' agreements that were only recently released. In others, COS did not have international agreements on specifications," he said. "I can't fault COS for being late."

Sandel said COS was in the process of building up staff to a target level of 130 people by the

"it always seems to come as a surprise" to members when tools are delivered late, he said.

"While it is true we have slipped some schedules," some members' expectations were also higher than what COS could achieve, he said.

Sandel said delays in test tool deliveries have not kept members from developing OSI products. While some testing tools are not yet commercially available, he said, the products are available for use in the COS lab.

Duane Bowman, director of planning and development for Novell, Inc.'s software products group and a member of the COS board of directors, said Novell has not experienced problems due to COS' delivery problems. He said the company has been performing its own tests on OSI products. The COS testing equipment "will be of more benefit to users than vendors," he said.

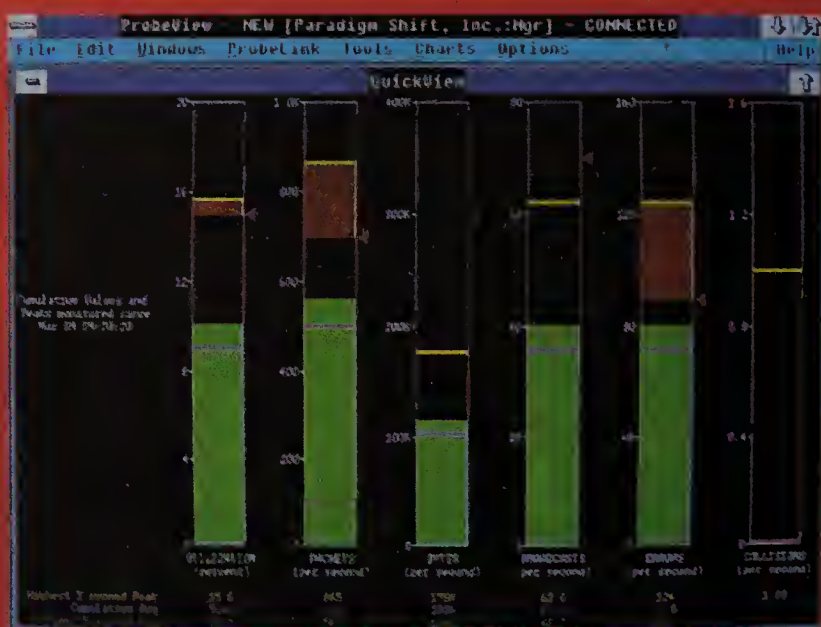
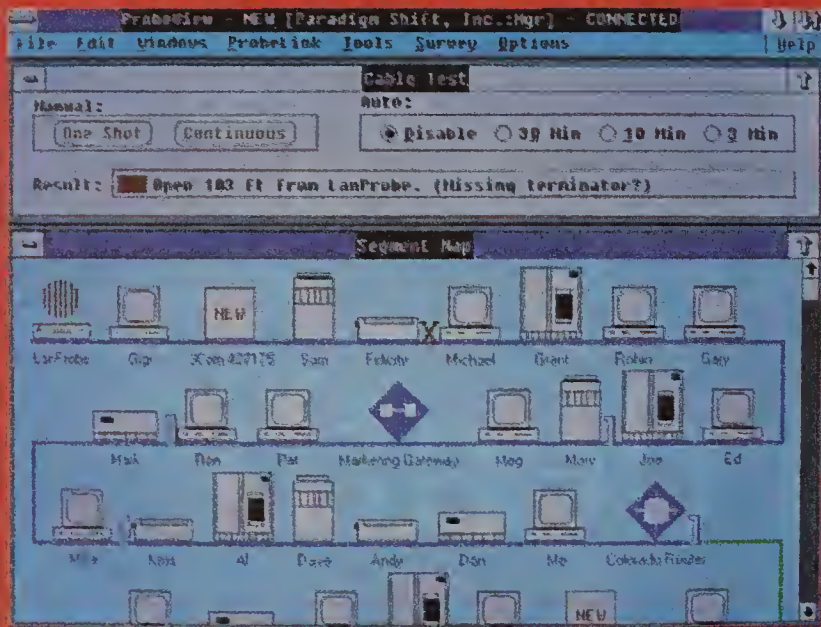
"Users will want to protect themselves from interoperability problems" and will look for third-party accreditation from a program like the COS Mark, he said. But even this will not happen until after August 1990, when the government's mandatory OSI procurement policy goes into effect. At that point, "conformance testing will become a much more real issue," he said. **■**

The COS equipment "will be of more benefit to users than vendors," Bowman said.

▲▲▲

end of 1990, but when first-quarter results fell short of expectations, hiring came to a standstill. "We were not able put the intended manpower on some of the projects," he said.

Although COS tried to keep members informed about changes in product release schedules,



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User trusts future to 3+Open

continued from page 1

3+Open incorporates 3Com's Demand Protocol Architecture, which lets the operating system support multiple transport protocols including, eventually, OSI protocols.

In selecting 3+Open, the company — known until recently as the Linde Division of Union Carbide Corp. — rejected Novell, Inc.'s NetWare, Banyan Systems, Inc.'s VINES and IBM's LAN Server, Morgan said. One of the primary reasons he gave for Novell and Banyan being eliminated is that neither is currently shipping a version of its operating system based on OS/2; LAN Server, meanwhile, was deemed too expensive.

Quality action team

A "quality action team," consisting of 12 representatives from the company's MIS, communications, office automation and systems support operations, began its search for a local net operating system 4½ months ago. The company decided on 3+Open Version 1.1 earlier this month and last week ended its first full week of beta-testing the product, Morgan said.

The company says it has not worked with the product long

enough to comment on its performance.

"While not the favorite of anyone on the team, [3+Open] turned out to be a good compromise because it is strong in all areas," Morgan said.

"The group as a whole decided they liked the LAN Manager OS/2-based servers," he said. "They thought LAN Manager would be a good platform for application development and for future third-party applications."

“While not the team's favorite, [3+Open] turned out to be a good compromise.”

▲▲▲

While acknowledging that few third-party applications currently exist for 3+Open LAN Manager, Morgan said he expects that to change. "It's backed by Microsoft Corp. and IBM. That by itself should be enough to guarantee its success eventually."

In the meantime, Union Carbide Industrial Gases is tailoring its own applications for 3+Open. For example, a home-grown process-design application that currently runs on the company's IBM 3090 Model 180E mainframe is being modified to run in client/server mode on an OS/2-based server with a DOS-based workstation supporting a graphical front end.

Without the expanded memory OS/2 offers, the servers could not support such an application, Morgan said.

The big picture

Besides support for OS/2, the quality action team was also concerned with wide-area network support, meaning how well and how easily local network users could access resources on remote nets across the X.25 backbone.

The quality action team felt that NetWare scored low in those areas, Morgan said, because it relied too heavily on Novell's proprietary protocols. And Novell's traditional strong point — performance — was not among the top 10 criteria with which the team was concerned, he said.

Banyan's wide-area support — along with its naming service and administration features — was strong, but VINES was found lacking in other areas, Morgan

said. "The area where Banyan is weak right now is in IBM compatibility issues," he said.

For example, VINES does not support data link control, a link-layer protocol that is required for a local net and an IBM front-end processor to communicate, Morgan said.

In addition, it does not work

its competitors do, Morgan said.

In addition, IBM requires extra personal computers to fill such roles as print servers and bridges, rather than letting the server support those functions, he said.

LAN Server also supports only token-ring networks and is limited to OS/2 workstations, he said.

Net operating system selection criteria

Union Carbide Industrial Gases, Inc. outlined eight priorities in selecting its local net operating system (listed in order of importance — most important first).

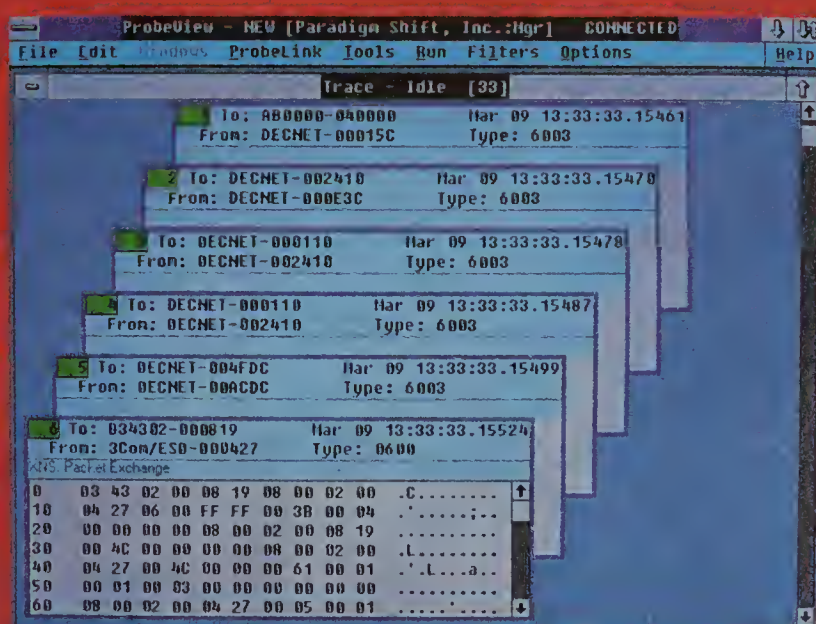
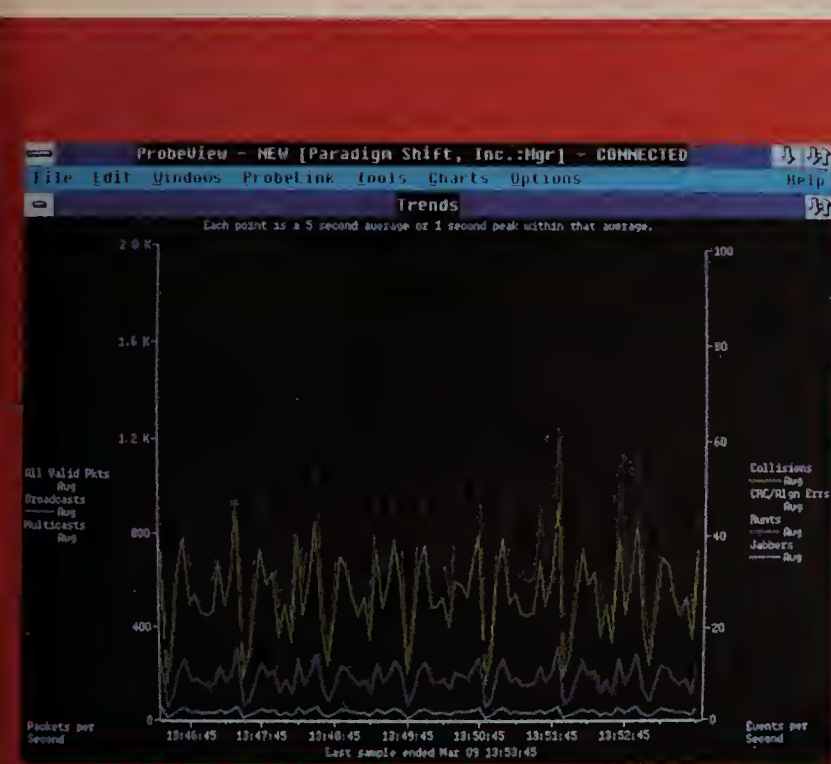
- 1 = Wide-area network support
- 2 = Compliance to local- and wide-area net standards
- 3 = User interface
- 4 = Support for IBM Token-Ring interfaces, source-routing bridges, 3270 emulation
- 5 = Network management
- 6 = Directory naming service
- 7 = Administration
- 8 = File and directory level security

with source-routing bridges, which IBM endorses for IBM Token-Ring Network bridging. And he said it would be 18 months before Banyan ships an OS/2 version of VINES.

IBM's LAN Server was ruled out because it is too expensive when used on a large scale because IBM charges customers on a per-workstation basis, as opposed to charging per server, as

Union Carbide Industrial Gases, although currently planning to standardize on token ring, wanted to keep open the option of using Ethernet.

NetWare was the first operating system to be knocked out of the running, and the quality action team was then split between LAN Server and VINES before compromising on 3+Open, he said. ■

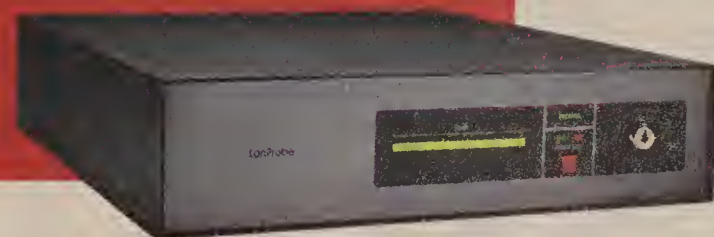


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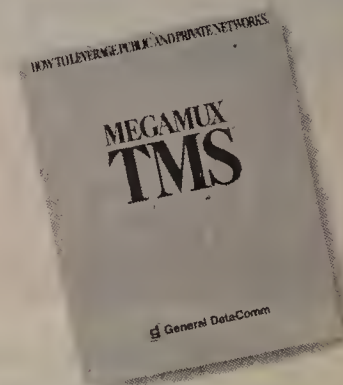
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INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

“In the final analysis, we must conclude that the crossover strategy of technical workstation vendors [into commercial markets] is full of so many holes that it looks and smells like aged swiss cheese.”

Excerpt from “Focus on Workstations: The Workstation Industry Crossover — A Brilliant Strategy or Pending Tragedy,” a report by The Sierra Group, Inc., a Tempe, Ariz.-based market research firm.

People & Positions

Michael Michigami last week was elected president and chief executive officer at **Datapoint Corp.** by the San Antonio, Texas-based company's board of directors.

Michigami replaces **Robert Potter**, who resigned to pursue other business opportunities.

Previously, Michigami served as president of the Control Systems Division of United Technologies Corp.

Datapoint is the developer of the Arcnet local network and sells a variety of computer and network products.

Mike Scott was named president of **WATS Marketing Group**, a wholly owned unit of American Express Information Services Co.

WATS Marketing Group, based in Omaha, Neb., is an inbound and outbound telemarketing service bureau that provides a variety of on-line information services.

Previously, Scott was chief administrative officer of American Express Information Services.

He replaces **Mike Parks**, who was recently named president and chief executive officer of **Call Interactive**, a new joint venture telemarketing company of American Express Information Services and AT&T. ☐

Infotron CEO Castle leads attack on T-3, global marts

Top exec drafts plan for maintaining momentum.

By Jim Brown
Senior Editor

BOSTON — Infotron Systems Corp.'s efforts to capture a larger share of the overseas T-1 multiplexer market and establish a leading role in the U.S. T-3 multiplexer arena are paying off, according to James Castle, the company's president and chief executive officer.

Castle, speaking here at an Infotron-sponsored analysts briefing, said the strategy helped the company turn a profit in 1988 after two years of losses.

The company intends to continue its strategy of marketing to multinational firms that spend 8% to 16% of their operating budgets on communications as well as to other select accounts.

Under Castle's leadership, the 21-year-old Cherry Hill, N.J.-based firm went from losses of \$10.9 million in 1987 and \$2.3 million in 1986 to a profit of \$4 million in 1988. Castle said the company made a \$2 million profit in the first six months of this year.

Since taking over the company in October 1987, Castle restructured corporate management, closed a manufacturing plant in Puerto Rico after moving the operations to existing U.S. plants and purchased T-3 multiplexer maker Licom, Inc.

With 2,000 customers in 57

countries, Infotron has moved from 11th place among international T-1 vendors in 1986 to third in 1988, according to Gartner Group, Inc., a Stamford, Conn.-based market research firm. Infotron trails Timeplex, Inc. and Network Equipment Technologies, Inc. (NET).

For the most part, this growth is due to increased T-1 sales overseas and Infotron's recent success in selling its T-1 and 45M bit/sec T-3 equipment in the U.S.

To keep the momentum going, Infotron hopes to capitalize on



Infotron's James Castle

the growing international T-1 market, Castle said. “The opportunity is greater overseas,” he (continued on page 12)

INDUSTRY BRIEFS

PictureTel Corp. last week reported a net loss of \$1.3 million for its second quarter ended July 1, an improvement over a net loss of \$2 million for last year's second quarter.

PictureTel, a Peabody, Mass.-based videoconferencing equipment maker, reported a more than fivefold increase in revenue — to \$4.1 million from \$784,000 for the second quarter of 1988. Second-quarter results were negatively affected by costs associated with the introduction of two new products, the V-3100 Videoconferencing System and the M-7000 Multipoint Bridge and Control System, the company said.

PictureTel recently revealed plans to support emerging international standards for videoconferencing system interoperability (“PictureTel wares to support videoconference standards,” *NW*, Aug. 14).

SynOptics Communications, Inc., a Mountain View, Calif.-based local network company, last week said it is extending its business operations in Canada with the opening of a new sales and service subsidiary in the Toronto area.

The creation of SynOptics Communications Canada, Inc. is designed to help the parent company meet the networking needs of Canadian users.

SynOptics sells the LattisNet family of local network products, which support 10M bit/sec Ethernets over a variety of cabling media, including unshielded twisted pair, shielded twisted pair and fiber-optic cable. ☐

Evolution of the MFJ

Jan. 1982	AT&T, Department of Justice and U.S. District Court enter into negotiations on the Consent Decree.
Aug. 1982	U.S. District Court Judge Harold Greene approves Modified Final Judgment.
Jan. 1984	Divestiture becomes effective.
Sept. 1987	First triennial review of MFJ by Greene; major restrictions kept intact.
Dec. 1987	Greene clarifies Sept. MFJ opinion defining manufacturing as including research and design as well as fabrication.
March 1988	Greene eases information services restriction, allowing RBOCs to provide gateways, E-mail and voice store-and-forward services.
July 1989	Greene agrees to delay 1990 triennial review indefinitely.

GRAPHIC BY SUSAN SLATER

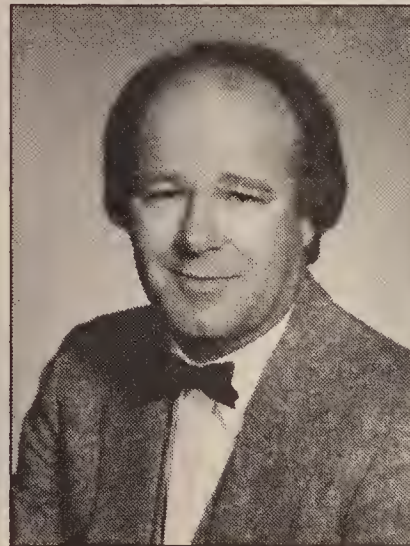
Greene's MFJ moves draw mixed reaction

RBHCs criticize Judge's decision to postpone Consent Decree review, but users unconcerned.

By Gail Runnoe
Washington Correspondent

WASHINGTON, D.C. — U.S. District Court Judge Harold Greene's decision to indefinitely postpone the next triennial review of the Modified Final Judgment may have the RBHCs fuming, but users don't see the move as a setback for the telecommunications industry.

Last month, Greene essentially washed his hands of the review process when he granted a Department of Justice request to delay the planned 1990 triennial review until appeals of the 1987 review are resolved. Greene refused to set a timetable for any future reviews of the Modified Final Judgment.



ICA's Brian Moir

That means current business restrictions on the regional Bell holding companies will remain intact unless the court grants piecemeal relief through the waiver process or Congress passes legislation altering the terms of the Modified Final Judgment.

However, industry observers say it is unlikely that such legislation would be approved in the

near term.

Line-of-business restrictions prevent the RBHCs from manufacturing telecommunications equipment and providing long-distance and certain information services.

The RBHCs, which have put strong public pressure on Greene to release them from Modified Final Judgment restrictions, claim that Greene's decision to shelve the triennial review will slow the introduction of new products and services and harm the U.S. economy.

But top officials of major U.S. users groups say there is no shortage of services and products, adding that they are not sure what benefits would accrue from removing the line-of-business restrictions.

“Where is the American public standing up and saying ‘Free the RBHCs’?” asked Brian Moir, counsel for the International Communications Association.

“Judge Greene realizes [the triennial review process] is a tremendous waste of time and resources,” Moir said. Because the RBHCs still have bottleneck control over the local loop, changes in the Modified Final Judgment were not likely to result from a second triennial review, he added.

“Unless there's a change in competition, there won't be a change in the MFJ vis-a-vis the court,” he said.

The triennial review process was designed to be a comprehensive reexamination of the telecommunications market every three years after the breakup of AT&T to determine whether competitive changes merited altering the Modified Final Judgment.

After the last triennial review (continued on page 13)

Infotron to unveil bevy of products

Infotron Systems Corp. is expected to announce several new products at the Tele-Communications Association, Inc. show in San Diego next month, including microcomputer software that lets users configure networks of Infotron statistical multiplexers. The firm will also unveil a feeder multiplexer that lets users link small offices to backbones based on Infotron's Infostream T-1 multiplexers.

With Infotron's Network Processor Configuration Program software, users will be able to use a personal computer to configure a network of up to 96 of the company's 990 Network Processor (990NP) statistical multiplexers. The microcomputer will download configuration data to a central-site 990NP, which will then automatically configure the remote 990NPs.

The Network Processor Configuration Program can store up to nine 990NP network configurations, enabling users to change the configuration to support varying traffic patterns at different times of day. The software will cost between \$10,000 and \$15,000.

The new feeder multiplexer, the Network Exchange (NX) 3020, will be capable of linking as many as seven data devices, each of which can operate at up to 64K bit/sec, to an Infostream T-1 multiplexer via a composite link operating at up to 72K bit/sec. The NX 3020 will cost \$2,500.

Infotron is also scheduled to announce:

- An enhanced LAN Span Ethernet bridge capable of supporting links to four remote Ethernets at up to T-1 speed. The product currently supports a single T-1 link between Ethernets. The price for the bridge has not been set.

- Transmission Control Protocol/Internet Protocol software for its Commix 32 communications server, which supports communications among up to 32 directly attached personal computers. It can also be attached to an Ethernet, letting directly attached microcomputers access Ethernet devices. The TCP/IP software enables the Commix 32 to route data between microcomputers and Ethernet-attached devices running TCP/IP. The software will be free for current Commix 32 users.

All the products are scheduled to ship before year end.

— Jim Brown

CEO leads attack on T-3 mart

continued from page 11

said. With foreign countries deregulating telecommunications in much the same way it was deregulated here, Castle expects the demand for private networking equipment to explode.

Analysts say Infotron is well-positioned to capture some of the resultant sales. "They are an entrenched vendor overseas," said

Mark LaRow, a consultant with Ernst & Young's Fairfax, Va.-based Network Strategies consulting practice.

Although Infotron has a loyal base of U.S. customers, according to LaRow, the company could not bring out T-1 products as quickly as companies such as NET, so it turned to the overseas market.

Infotron focused on making a T-1 multiplexer that supports international T-1 speeds of 2.048M bit/sec. The company also geared up to crack the overseas market while its U.S. operations remained focused on its core statistical and time-division multiplexer business.

In addition, Infotron focused its stateside efforts on grabbing a lead in the T-3 market. Castle said Infotron is the only U.S. vendor

shipping a networking T-3 multiplexer. Having the T-3 product produced a side effect that has helped Infotron sell T-1 multiplexers in the U.S., LaRow said.

U.S. companies that may want to expand to T-3 bandwidth without changing vendors are likely to choose a company that can supply the product today, he added. But with both Timeplex and NET committed to rolling out T-3 products by early 1990, Infotron



may face stiffer competition in the future.

To maintain customer loyalty, Infotron has created an Infotron Advisory Council comprised of 12 users — six from the U.S. and six from overseas. The council meets twice a year and advises Infotron what type of new products they should develop.

"This is something that is different from a lot of other vendors," said councilman Dick Conrad, assistant vice-president of telecommunications at Boston-based State Street Bank.

Conrad said he has urged Infotron to continue enhancing its existing statistical multiplexers. The bank currently uses Infotron's 990 Network Processor (990NP) statistical multiplexer to support links between its offices in Boston, England and Australia. The bank will soon add a link to its West German office, he said.

In the U.S., State Street Bank uses Infotron T-1 multiplexers to link its offices in Boston, New York and Quincy, Mass. Infotron is scheduled to announce several new products at the Tele-Communications Association show in San Diego next month (see "Infotron to unveil bevy of products," page 12).

Although Infotron promotes its status as an independent company — Timeplex is owned by

Unisys Corp. and NET has a strategic alliance with IBM — given the number of industry mergers and acquisitions, some analysts wonder how long Infotron will be able to survive alone.

If it is approached as a takeover target, Infotron will likely be by a firm looking to cash in on Infotron's presence overseas, according to Harry Rosenthal, an analyst with New York-based Deutsche Bank. □

Moves draw mixed reaction

continued from page 11

in 1987, Greene loosened the information services restrictions, permitting the RBHCs to provide electronic mail, gateways and voice store-and-forward services. All other restrictions remained intact.

Last month, Nynex Corp. and Bell Atlantic Corp. petitioned Judge Greene to establish a deadline for the next triennial review. These proceedings would commence with the preparation of a market report by the Justice Department.

Greene told the carriers that "the department has complete discretion on whether and when to file another report" and that the court would not interfere with the exercise of that discretion.

Greene also said there is no immediate need for another triennial review since the court has been reviewing the Modified Final Judgment almost continuously as a result of the "incessant stream" of RBHC waiver requests.

The RBHCs had hoped the second triennial review would result in the further loosening of the restrictions in a more timely fashion than the piecemeal waiver request process.

"The waiver process [brings] relief more slowly than the triennial review process," said Link Hoewing, director of issues management at Bell Atlantic. "The triennial review could provide faster and more comprehensive relief."

While Hoewing also said the delay in the triennial review process will harm the industry by preventing the RBHCs from bringing new products and services to the marketplace, others disagreed.

Alan Pearce, president of Information Age Economics, a Washington, D.C.-based telecommunications research firm, said, "The vast majority of users accept today's situation. They are happy with the prospect of the status quo."

Even if Greene had ordered a second review, little was likely to have resulted from it because "Greene wasn't of a mind to change [the Modified Final Judgment] anyway," Pearce said.

Ken Phillips, chairman of legislative affairs for the Corporate Committee of Telecommunications Users, said the only concern users have about the postponement is that they lose the opportunity to file comments on the restrictions. Instead, he said, they will have to state their case to Congress during proceedings on telecommunications legislation.

Most observers said they do not expect Congress to act any faster than the court on lifting the Modified Final Judgment restrictions. According to Phillips, issues with higher visibility are likely to take precedence over Modified Final Judgment legislation. □

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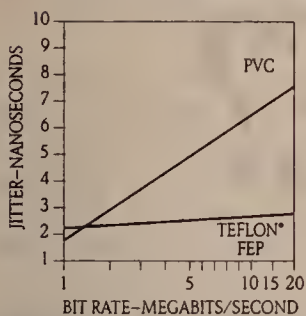
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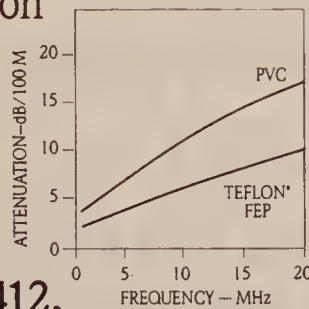


Jitter contribution of 24-gauge twisted pair cables with 6 to 7 mils of insulation.

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TELECOMMUNICATIONS

CARRIER SERVICES, CENTREX, CPE, WIRING SYSTEMS AND BYPASS

Worth Noting

The Eastern Management Group of Parsippany, N.J., estimates that the seven RBHCs will collectively install 782,000 Centrex lines by year end. About 39% of the lines are for PBX replacements, 38% are add ons and 23% will support new buildings.

Carrier Watch

In its search for a location for the 1991 Integrated Services Digital Network interoperability demonstration, the **North American ISDN Users' Forum** has asked the International Communications Association and the Society of Manufacturing Engineers to outline how they would participate.

The forum's Event Managerial Task Force will make a formal recommendation to the forum's executive steering committee after reviewing the proposals. The task force had made an interim recommendation that the event be held in Houston in conjunction with Supercomm '91.

Williams Telecommunications Group, Inc. (WTG), a nationwide private-line carrier, recently announced availability of 64K bit/sec clear channel capability for users of its T-1 service.

WTG made the capability possible by deploying intelligent T-1 multiplexers in its 11,000-route-mile fiber and digital microwave network.

Use of bipolar eight zero code substitution enables customers to use the full bandwidth of each DS0 channel.

The clear channel capability, offered as an optional feature, is available with point-to-point and point-to-multipoint T-1s. Although the option carries no monthly fee, customers must pay a onetime \$500 setup fee for each T-1. □

Operator services revenues edge upwards

	Revenues (in millions)	Revenue growth rate
1989	\$12,290	9.4%
1990	\$13,339	8.5%
1991	\$14,358	7.6%
1992	\$15,328	6.8%
1993	\$16,225	5.9%
1994	\$17,050	5.1%
1995	\$17,807	4.4%

GRAPHIC BY SUSAN SLATER SOURCE: MARKET INTELLIGENCE RESEARCH CO. MOUNTAIN VIEW, CALIF.

ISDN trendsetter discusses use of technology at WVU

University learns of trials, tribulations firsthand.

Jeffrey Fritz
Special to Network World

MORGANTOWN, W.V. — A year after West Virginia University began using Integrated Services Digital Network offerings, we have begun reflecting on what we've learned.

We have suffered through the limitations of ISDN customer premises equipment, learned to live with ISDN quirks and chalked up some successes implementing the service on campus.

The greatest frustration has been the slow acceptance of the technology. Originally, ISDN was slated to replace many older campus data networks. Offering departments full ISDN data and voice services was an exciting and promising idea.

ISDN is not an all-encompassing solution for data communications needs.

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Unfortunately though, up to this point, it hasn't worked out that way. To a large degree, this can be attributed to our campus telephone system — a Centrex system that supports campus key systems.

In order to bring ISDN to the desktop, ISDN key systems would need to be installed. Although we have released a request for proposal for such a device, full ISDN key systems are not available yet. Thus, there is still the problem of how to offer ISDN desktop connectivity to users on campus.

Fritz is a data communications analyst at West Virginia University.

Other problems hampering acceptance of ISDN here include the difficulty of finding cost-effective ISDN applications, the extensive testing necessary before applications can be put into effect, the expense of available customer premises equipment and internal disagreement as to how ISDN should be implemented.

Some 660 lines on our 4,900-line digital Centrex can support ISDN, but we've only implemented less than 5% of the ISDN lines.

In a sense, ISDN is like potter's clay. It consists of a series of specifications that can be molded in various ways to perform a variety of jobs. The most difficult part of implementing ISDN is not in finding the right tools; it is finding the applications to use with the tools.

During the past year, we were not so much looking for solutions; we were seeking applications to provide those solutions. This is not to imply that good applications aren't out there. They are, but chances are they won't come looking for us. We have to go out and find them.

Of all that we have learned, this one point is probably the most essential: ISDN is not an all-encompassing solution for data communications needs.

For some users, ISDN offers too much connectivity at too great a cost. For others, ISDN is too slow and considered obsolete from the start.

Finding the middle ground where ISDN can provide an effective data communications solution and still be cost-effective is difficult. It takes time and effort to match applications to ISDN, but it is worth the effort.

Our greatest disappointment with ISDN has been the high cost of ISDN customer premises equipment, especially in comparison with equivalent analog gear.

Whenever we make this pro-
(continued on page 18)

ESF gathering fans in maturing market

User demand for extended superframe format is making vendors stand up and take notice.

By Bob Wallace
Senior Editor

The extended superframe format (ESF), a T-1 framing format that enables users and carriers to monitor and manage circuit performance better than older schemes, has won wide industry acceptance and acclaim.

Corporations are using ESF to help maintain circuit quality and speed problem resolution. In addition, they are awaiting ESF management tools that centralize and automate much of T-1 performance monitoring. These products could hit the market by year end.

AT&T developed ESF in the late 1970s to perform diagnostics on T-1 links without taking them out of service.

Commercial availability

Sensing user demand for T-1 performance monitoring, vendors such as Verilink Corp. began building ESF products for use in public and private networks in 1983. AT&T did not announce commercially available ESF CSUs

until earlier this year.

ESF provides better performance and diagnostic data than what was available with D4 framing by using advances in digital signal processing to free up bits in the ESF frame that can be used to carry performance and diagnostic information.

As a result, users can run diagnostics on a T-1 while the line is in use. In comparison, T-1s with D4 framing had to be taken out of service to be tested.

Channel service units (CSU) attached at each end of a T-1 line collect and store line performance data — measured in errored seconds and failed seconds — in two sets of registers. One set can be accessed by the user; the second can be accessed by the carrier.

Several years ago, users began buying ESF-compatible CSUs made by vendors such as Verilink and Larse Corp. to collect the ESF data from the AT&T network.

An on-site personal computer equipped with ESF-compliant
(continued on page 18)

WASHINGTON UPDATE

BY ANITA TAFF

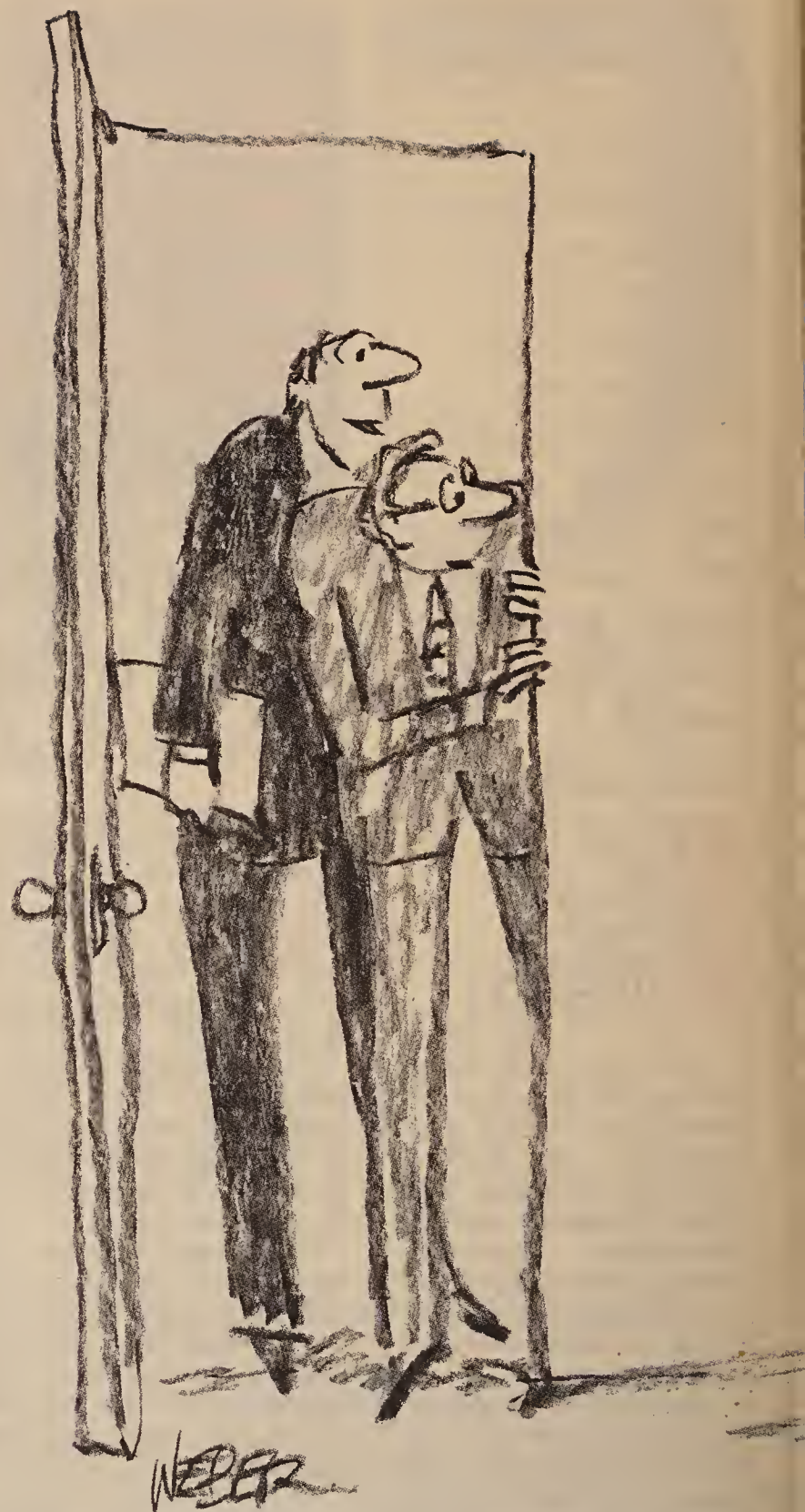
AT&T defends price caps, again. AT&T was on the defensive again last week over the rates it has filed under price caps. Rival Allnet Communications Services, Inc. had asked the Federal Communications Commission to reject AT&T's initial price cap filing, which reduced residential and small business rates by \$140 million. The FCC dismissed the objections and allowed the new tariffs to take effect July 1.

Allnet still insists AT&T failed to provide sufficient data on individual service element costs and has asked the FCC to review its earlier decision. AT&T last week opposed Allnet's request, arguing that the price cap plan states that detailed cost and information concerning demand must be used in calculating rates but there is no requirement that such information be released publicly. AT&T also argued that providing cost information on about 6,000 rate elements for its services would destroy the savings price caps are intended to provide.

Waiting on Tariff 12. Late last week, AT&T was also waiting to see if the Federal Communications Commission would allow it to proceed with Tariff 12 offerings for First Chicago Corp., Combustion Engineering, Inc., Prudential Insurance Co. and an international network for General Electric Co. All those offerings were filed in late June and were scheduled to go into effect earlier this month.

The FCC had asked AT&T to defer the effective date until Aug. 19 so that it would have more time to examine the offers. Meanwhile, the FCC has allowed all of the previous eight Tariff 12 deals to proceed. The agency can either allow the offers to take effect, or if it believes there are serious questions about the deals' lawfulness, it could initiate an investigation. □

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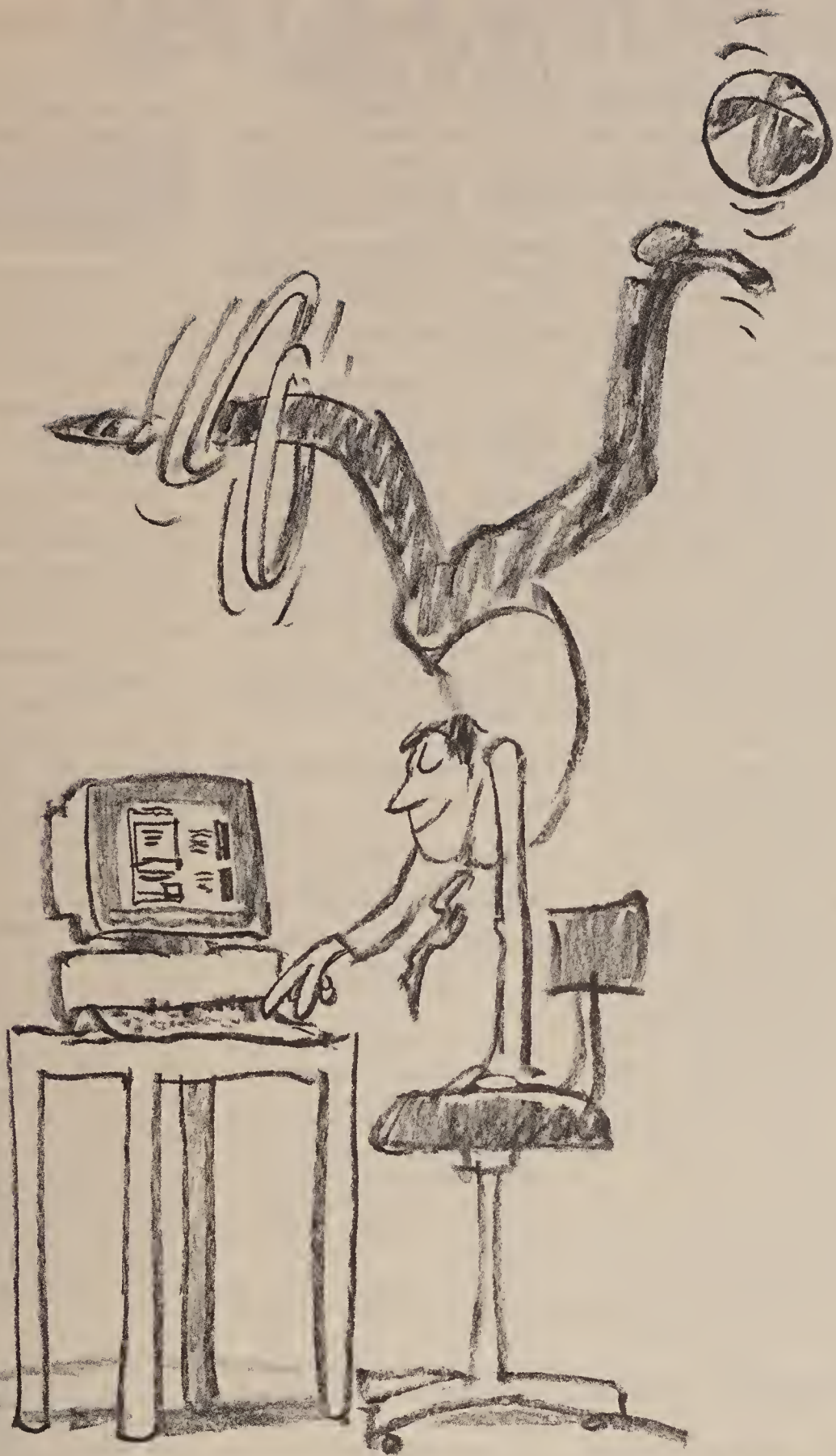


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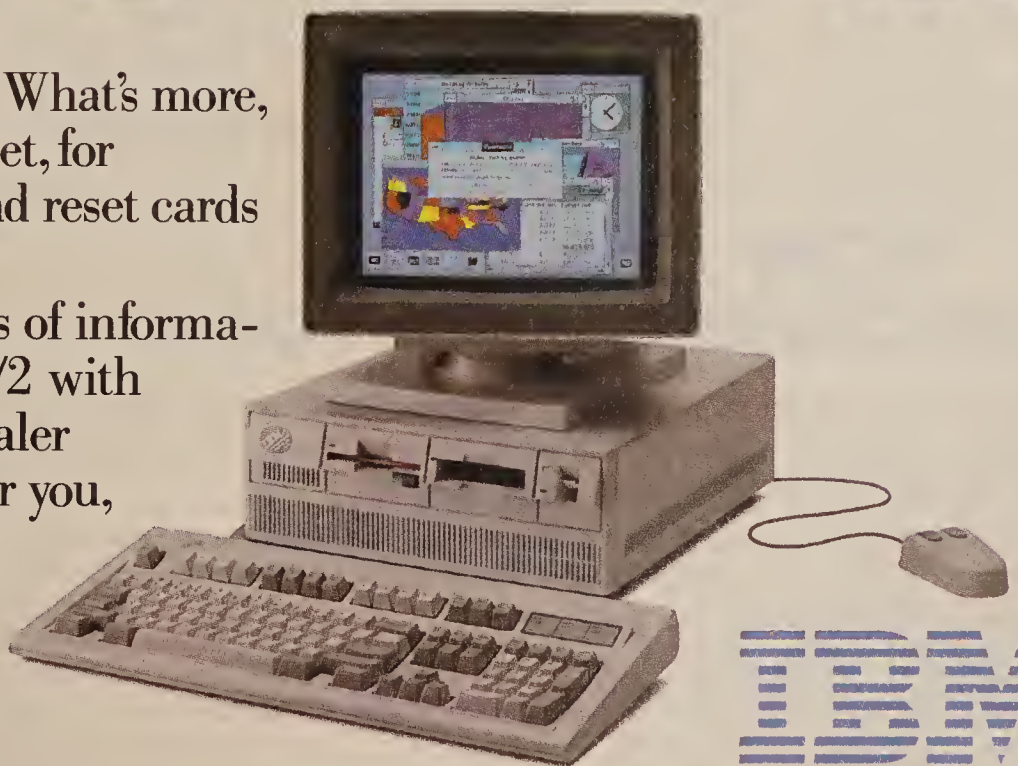
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IBM

Trendsetter discusses technology

continued from page 15

nouncement, our operating company cries foul. It claims, and with some justification, that we were warned that ISDN customer premises equipment would be expensive. Perhaps so, but the cost of ISDN didn't hit home until we had to pay for the equipment.

Of course, we need to acknowledge that "equivalent analog" equipment is something of a misnomer. Given the increased functionality, speed and service provided by ISDN customer premises equipment, can there really be such a thing as equivalent equipment?

Applications

Since we couldn't sit and wait for the applications to come to us, we had to go out and find them. In some cases, we created our own. Some of those applications are now in working environments, while others are still being tested.

One of the working applications is an X.25 mainframe link implemented on an ISDN B channel. It allows up to 64 users to call the ISDN central office switch using their D channels and be assigned a virtual channel on the X.25 link running between the central office and the mainframe.

This means the mainframe no longer needs to support 64 analog lines, modems and data switch ports. ISDN users can be accommodated with a single channel, a single port and one basic rate interface at speeds approaching 9.6K bit/sec.

The central office ISDN switch can provide contention for the 64 virtual channels to an even larger group of users. Since the ISDN Basic Rate Interface provides two B channels, the number of user ports can be doubled simply by adding a second X.25 handler at the data switch.

Other interesting applications are still being tested. Two of the most important are ISDN synchronous connectivity for IBM 3270 users and connectivity to the IBM mainframes from asynchronous personal computers.

Our campus is divided between asynchronous users, largely made up of faculty, and synchronous users, mostly staff

personnel. However, all users need access to financial records kept on the mainframe.

The mainframe program used to provide the financial information is touchy about asynchronous emulation of 3270 terminal devices. We are now trying different solutions both in hardware and software to see if true emulation can be provided over ISDN.

We are also searching for the most efficient way to connect 327X terminals to 3X74 controllers. Most of our 3X74 controllers are currently located at user sites. If they were moved to the mainframe site, ISDN could be used to eliminate coaxial cable terminal links, making terminal moves, changes and additions as easy as making a telephone call.

One of the more interesting applications now under test is the use of ISDN links to bridge Ethernet local networks. A series of tests between two of the busiest campus Ethernets started on July 1 and will continue through September.

Vendor cooperation has been terrific, with support currently being provided by Microcom, Inc., Vitalink Communications Corp., 3Com Corp., Experdata, Inc. and St. Clair Network Management.

We see potential for this application both as a backup to the higher speed bridge links and as a primary link for users who do interactive work between Ethernets. If these tests continue to be successful, this application could suit the needs of small departmental Ethernet users who need bridge speeds exceeding 19.2K bit/sec but can't afford the cost of a T-1 or microwave link.

Looking back

An early ISDN slogan on campus was "put in an ISDN for voice service, and data is a 'give me.'" Sometime during the past year, that slogan reversed. Data has become the driving force of our ISDN implementation.

A user with little need for data is not likely to be the recipient of ISDN services — at least not now. But a serious data user is likely to get ISDN for his data communica-

tions, and the voice service becomes the "give me."

In retrospect, it is clear we had a few things going in our favor. First, we had support from our operating company. The Chesapeake and Potomac Telephone Co. of West Virginia is an avid supporter of ISDN and believes it is the service of the future.

Secondly, we were too naive to believe those who said that certain things "could not be done." In our ignorance, we did the "undoable," and some preposterous applications actually worked.

Lastly, we took the important step of establishing an ISDN application lab to explore the capabilities of ISDN and to test vendors' equipment in our computing environment.

Frankly, I don't know how we would have implemented ISDN without the lab. At this early stage of ISDN implementation, any potential user should seriously consider developing an ISDN lab of their own. The lab need not be fancy or expensive. Our lab cost about \$35,000 to implement.

But does it work?

Has ISDN been a reliable service? Although we haven't polled users, for the most part, we have found ISDN to be reliable and virtually error-free. That doesn't mean that we haven't experienced our share of bugs and enigmas. As with any new service, there are always some wrinkles to work out.

There is one problem that is troublesome and has yet to be solved. Interestingly, it has affected primarily the voice services. Active ISDN voice calls are randomly — but infrequently — cut off.

When it happens, the desk set displays a "congestion" message and the appearance of the call goes away. Because of its sporadic nature, we have not been able to track down its cause.

Very few of the difficulties we've encountered actually come from the ISDN service. There are some problems with customer premises equipment and problems with the "fit" between certain equipment and our applications. However, ISDN has proven itself to be a reliable and consistent data transport. ■

ESF gathering fans in market

continued from page 15

software and located at the company's headquarters or net management center is used to poll ESF CSUs in the network every 15 minutes. The data can be displayed on the personal computer screen and downloaded to a printer for hard-copy reports.

ESF pioneers, such as FMC Corp., a Dallas-based defense contractor, use ESF to chronicle circuit outages and their causes. "ESF is fantastic," said Richard Bruyere, program manager for telecommunications at FMC. The ESF data, collected in the CSUs' registers can be read and printed out but cannot be altered. "No vendor is going to question that [data]," he added.

"If you have a serious problem on a circuit, you can use this

The next wave of ESF products will make ESF easier to use, according to Bruyere.

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proof to get outage credits from the carrier," he added. FMC, which began using ESF in February 1987, employs it throughout its seven-node, fiber-based T-1 network.

When the quality of the T-1 net degrades, FMC redirects data traffic off the T-1 line onto AT&T's Accunet Switched 56K facilities. Voice traffic is routed to other carriers' long-distance facilities. "The user never knows that the calls are using backup facilities," Bruyere said.

The next wave of ESF products will make ESF easier to use, according to Bruyere. Currently, the user must manually set bit error rate thresholds using dip switches on each CSU in the network. The next generation of CSU-based systems will enable a user to download and change settings for all CSUs in a sprawling T-1 network from a personal

computer at a central site, Bruyere said.

Other users including CompuServe, Inc., The Travelers Corp., Lucky Stores, Inc. and TRW Information Services Division also use ESF.

CompuServe uses ESF to monitor performance of 50 T-1 lines, 37 of which are used to access AT&T's Megacom service, while the rest carry only data. "The ESF CSUs are our only means of keeping an eye on the voice circuits," said Rand Kennedy, network projects manager for the Dublin, Ohio-based firm.

The CompuServe CSUs are set at a bit error rate of 10^{-4} . If the bit error rate falls below that mark, the CSU calls in the alarm to a personal computer at the firm's network operations center.

"When we get the first alarm on a Megacom line, we pull the historical records to see if we have had problems with it before," Kennedy said. "If we haven't and the severely errored seconds continue, we know we have a major problem."

At that point, the CompuServe network operator reports the problem and passes the CSU information to an AT&T technician. This procedure helps reduce the amount of time needed to isolate and correct the problem, he said. "This eliminates a great deal of vendor finger-pointing."

Kennedy said vendors of ESF CSUs should develop graphical user interfaces for their personal computer-based ESF systems. "It'd be great to be able to display ESF performance data using color graphics. Right now, this information is set up in tabular format," he said.

Kennedy said he would also like to see some form of artificial intelligence incorporated in future personal computer-based ESF systems to help automate the decision-making process that follows trouble alarms. "It still takes humans to figure out what to do when the alarms start coming in," he said.

Like FMC, CompuServe presents precise outage information collected by the ESF CSU to AT&T for outage credits from the carrier. "Before ESF, we were guessing at our total downtime," Kennedy said. ■

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DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

A recent study by Fairfax, Va.-based Federal Engineering, Inc. on the T-3 market concluded users will most likely employ the 45M bit/sec capacity to support links between remote local nets, ties between remote mainframe channels and compressed videoconferencing.

Data Packets

Coors Brewing Co. last week announced it has contracted to use McDonnell Douglas Network Systems Co.'s Tymnet packet network to give users on its Fiber Distributed Data Interface (FDDI) backbone network links to other sites nationwide.

Coors' FDDI backbone links an array of Ethernet-based local networks at the firm's sprawling Golden, Colo., campus, said John Andrews, net planner for Coors.

FDDI was required to handle file transfers of data from the computer-aided design applications the firm uses to design its brewery systems and to allow for future growth on the net, Andrews said.

The Tymnet division, which also acted as systems integrator for the net, will give users on the Golden campus access to nets at nationwide distribution centers and, eventually, to Coors subsidiaries.

Infonet last week said packet-switch users in Singapore now have direct access to its worldwide X.25 packet-switched network. Previously, Singapore customers needed a gateway service to link to Infont.

The direct dial-up or dedicated Infont access is possible because of an alliance with Singapore Telecom International, which owns a stake in the network. Users in 105 countries now have direct access to the Infont network. **Z**

Early EDI user British Coal sees gold in them thar nets

Company is leading push for EDIFACT standard.

By Bob Brown
Senior Editor

CANNOCK, England — British Coal has struck it rich using an electronic data interchange network that saves it more than \$1.6 million a year by reducing inventories and eliminating many paper-handling tasks and errors resulting from data entry.

As an EDI pioneer in the U.K., British Coal has learned firsthand about the benefits and pitfalls associated with implementing a computer-to-computer system for exchanging documents with trading partners.

Armed with its EDI experience, British Coal is spearheading an effort to form a group of users in the U.K. interested in employing the emerging EDI for Administration, Commerce and Transport (EDIFACT) international standard. The group's goal is to choose a common subset of EDIFACT standards to use (see "British Coal works toward one standard," page 20).

British Coal, which operates coal mines across the U.K., is a

nationalized company whose EDI activities grew out of the automation and centralization of its internal purchasing facilities during the late 1970s and early '80s.

Since British Coal began using EDI in 1982 to transfer purchase orders and invoices, about 150 of its trading partners — accounting for about 500 trading sites, including their distribution/order offices and subsidiaries — have committed to electronic trading.

Most of those firms have come aboard as EDI users since 1987, when British Coal moved away from conducting EDI transactions over private lines and started using a third-party network provided by Istel, a value-added network provider in the U.K.

British Coal's purchase handling system is anchored by an IBM 3081 mainframe here that supports homegrown EDI software. The computer center electronically transmits some 200,000 purchase orders per year and automatically checks

(continued on page 20)

Cab firm's dispatching net yields edge, fewer disputes

By Paul Desmond
Senior Writer

DETROIT — Checker Cab Co., based here, is the latest taxi company to opt for an automated dispatching system that promises hefty productivity gains and eliminates charges of favoritism and fare stealing among drivers.

The minicomputer-based system supports dispatch center telephone operators and uses radio links to forward driver instructions to dashboard-mounted data terminals.

This system replaces voice radio networks, which cab companies said are subject to dispatcher favoritism and fare stealing by drivers who respond to calls intended for colleagues.

The system is based on Digital Equipment Corp.'s MicroVAX minicomputers and Gandalf Systems Group's Cabmate data terminals, which include an LCD display and 16-button keypad. The networks promise to increase productivity by helping taxis reach customers faster and by eliminating costly "dead-head" runs, in which a driver drops off a passenger and then returns to a favorite base area without a fare.

Some taxi companies feel the

networks will also help them expand into new businesses, such as the courier business, which have been out of reach because the companies could not maintain close enough contact with drivers and cabs were not sufficiently responsive.

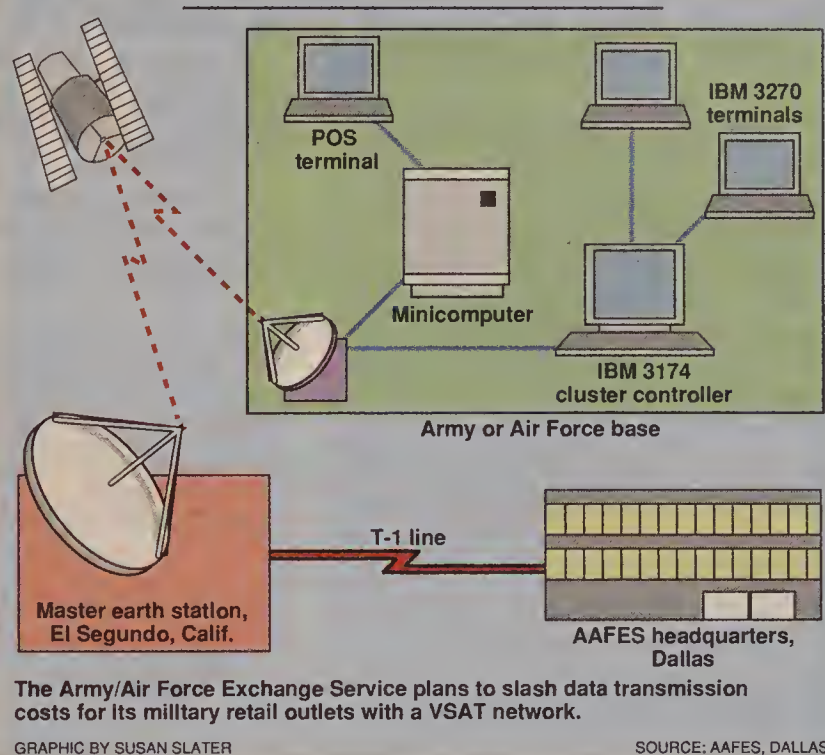
"We believe that it's going to increase our business by at least 50%," said Bernard Goldberg, president of United Cab Association of Philadelphia, a taxi cooperative that provides dispatching and accounting services for some 800 cabs. That increase, which Goldberg called conservative, will come from generating more business for existing cabs by answering telephone calls faster and breaking into new markets such as deliveries of letters, small packages, blood and X-rays.

With voice dispatch systems, taxi companies typically have operators answer phones and type or hand-write the name and address of the customer. That information is passed on to a dispatcher, who searches for a driver in the customer's area. Theoretically, the first driver to answer the call gets the fare.

But there are an array of prob-

(continued on page 20)

VSATs will man the base



Military group sets out on net mission

Army/Air Force Exchange Service plans to save \$5m annually by linking base post exchanges.

By Paul Desmond
Senior Writer

DALLAS — A \$6 billion-per-year retailer that supports military post exchanges (PXs) is embarking on a network mission that promises to save \$5 million per year by automating merchandise ordering and financial reporting.

The automation effort will support two new applications that provide timely inventory and fiscal data, and make planning more efficient, said Maj. Jim Heaberg, chief of the U.S. Army/Air Force Exchange Service (AAFES), based here. AAFES operates all Air Force and Army PXs.

The applications, AAFES Store Automation Program (ASAP) and Integrated General Ledger Accounting System (IGLAS), are being developed in conjunction with the Coopers & Lybrand accounting firm, Heaberg said.

VSAT to trim costs

AAFES is also installing a Hughes Network Systems, Inc. very small aperture terminal satellite network to replace its current network of leased lines. The VSAT network is expected to save \$1.5 million per year in line and maintenance costs, according to Jim Spires, chief of data communications for AAFES.

On military bases worldwide, AAFES operates some 17,000 PXs, ranging from hot dog stands to major department stores, Heaberg said.

They are all currently supported from a data center here by Am-

dahl Corp. 5880 and 5890 mainframes.

POS possibilities

The ASAP project requires the installation of minicomputers, which have not yet been selected, at 128 military bases nationwide to off-load PX support from the mainframes, Spires said. Each base minicomputer will support video display and point-of-sale terminals at PXs. A large base, for example, might have 60 PXs.

POS terminals will be polled

“In some cases, [the mini] could generate automatic reorders without someone having to count the items on the shelves.”

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periodically by the minicomputer, which, in turn, will transmit the data via satellite to the main headquarters here. The minicomputer will track stock levels at each of the exchanges it supports.

“In some cases, it could generate automatic reorders without someone taking a clipboard and a sharp pencil to count the items on the shelves,” as is the current practice, Heaberg said.

ASAP will also help the PXs

(continued on page 20)

British Coal works toward one standard

Since it started using the Istel public data net in 1987 to conduct electronic data interchange, British Coal has been a strong backer of EDI standards.

There was no universally recognized standard at the time British Coal first started using EDI, according to William Bedford, chairman of the company's EDI Steering Committee.

"Consideration was given to the imposition of British Coal's document standards, used with direct links, on suppliers who wish to trade electronically with us," Bedford said. "This was rejected on the basis that using British Coal standards could restrict the size of [the] community prepared to trade electronically with the industry."

British Coal wound up adopting standards from two bodies — the Article Number Association (Tradacoms standard) and the Society of Motor Manufacturers and Traders (Odette standard).

The Tradacoms standard is used for purchase orders, while the Odette standard is used for invoices.

Now British Coal is trying to evolve into a user of the emerging EDI for Administration, Commerce and Transport (EDIFACT) international standard.

"British Coal is monitoring [EDIFACT's] progress with a view to adopting this approach as the EDI formats receive wider acceptance," Bedford said.

The company is arranging a meeting this month with other EDI users in the U.K. who are interested in adopting EDIFACT. The group's goal will be to adopt a common subset of EDIFACT options by year end, he said.

— Bob Brown

Early EDI user sees gold in them nets

continued from page 19

the validity of invoices against these purchase orders.

Just rewards

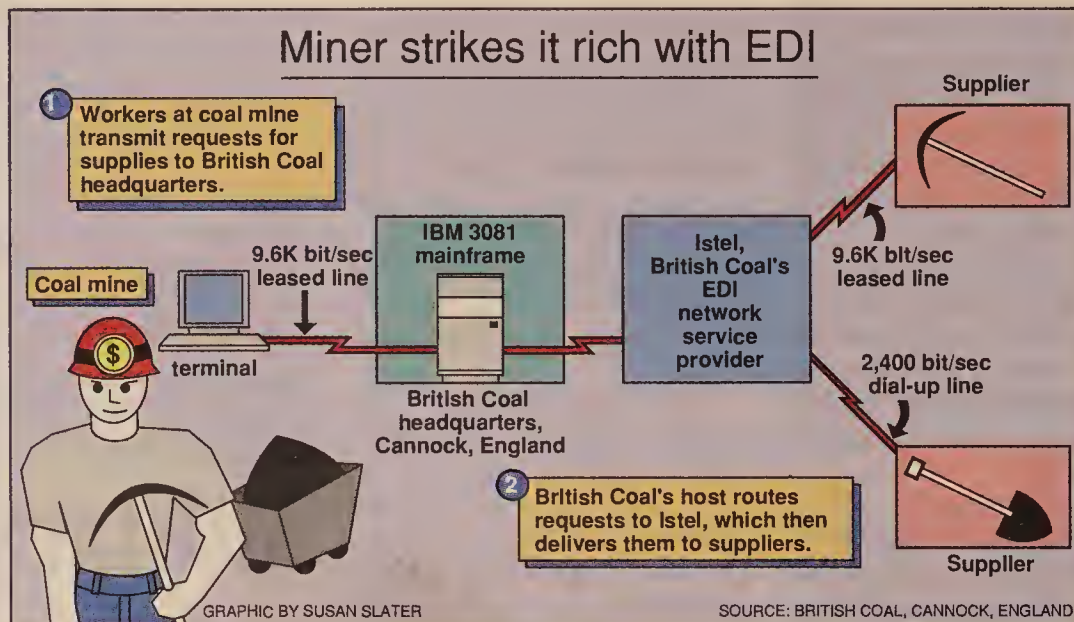
British Coal's EDI efforts have paid off in a number of ways, according to William Bedford, chairman of the company's EDI Steering Committee.

The rewards include speedier communications that have cut lead times for ordering supplies; confirmation that docu-

but another 25% rejected EDI outright and are still using paper documents, Bedford said.

British Coal "has absorbed many man-hours in selling the concept" to the rest of its suppliers. "This has not been because of reluctance to adopt EDI as such, but more because it has represented additional outlay and additional demand on their internal DP resources," Bedford said.

Persuading trading partners to receive electronic purchase orders has been easier than getting them to send invoices, he said. Suppliers "felt that most of the benefit [of sending invoices electronically falls] to



ments have been received, which has strengthened business relations; and the ability to implement just-in-time provisioning.

Bedford figures his company is saving about \$1 million a year by shortening delivery cycles and reducing inventories. The company is also saving approximately \$50,000 a year in labor and associated costs as a result of reduced paper handling and keying in of original documents.

EDI pitfalls

However, persuading its suppliers to use EDI has been a major obstacle in British Coal's efforts to become an EDI leader. About a quarter of the suppliers it has approached signed with Istel immediately,

British Coal with the removal of their expensive error-prone procedure of mail receipt, data entry and correction," he said.

The subsequent development of an invoice rejection report that automatically lets suppliers know whether the invoice they sent has been accepted or not has convinced suppliers that there are benefits to exchanging invoices electronically, Bedford said.

One surprise in the process has been the amount of EDI implementation support British Coal has had to provide to inexperienced trading partners, Bedford said. This has reduced the availability of British Coal's development staff to introduce new documentation formats and slowed down overall progress. ■

Cab firm's net yields edge, fewer disputes

continued from page 19

lems with this type of dispatching.

Besides dispatchers favoring certain drivers and some drivers answering calls assigned to others, many drivers also accept fares miles from the customer's location, therefore, degrading service. Goldberg said disgruntled drivers can also hold down the microphone key to prevent other drivers from contacting the dispatcher since only one person can talk at a time.

Gandalf's Cabmate system eliminates each of those concerns, users said. For example, Checker Cab plans to divide this city into about 100 zones, each about eight to 10 square blocks, said Jeff Priest, general manager for the company. Drivers, who typically have a favorite area where they look for fares, key the zone number where they are at any given time into their data terminal.

Meanwhile, at the dispatch center, operators sitting at dumb terminals linked to a MicroVAX 3300 answer customer phone calls and key in fare data. Software on the MicroVAX determines which zone the customer is in and which driver in that zone is next in line to receive the fare.

The VAX routes the data to one of three transmitting towers that together blanket the city. From there, data is routed over the company's existing 450-MHz voice radio network to receivers in the cab and then on to the mobile data terminals.

Since the data transmission only goes to the driver for whom the fare is intended, no other driver can intercept the fare. Customers get better service since drivers will be within eight or 10 blocks of their location and complaints of dispatcher favoritism are eliminated since the computer handles the dispatching.

Drivers should also earn more money since, upon picking up a fare, they can key in the zone where they will be dropping the fare off, Priest said. That places them on the list to receive fares in the destination zone when the passenger is dropped off, eliminating the deadhead run back to the base zone. ■



A Little Goes A Long Way.

It's only half the size of other Ethernet repeaters, and yet the RL6000 is long on features. It operates with or without an SOE test signal, it provides automatic and manual segmentation, it has comprehensive diagnostic indicators and it's compatible with either fiber or copper networks. On top of all that, it's readily available with an external power supply as the RL6000L or with a built-in power supply as the RL6000Li. And at about 11" x 8.5" x 2.5", it's easy to install wherever space is at a premium, plus it can stand alone or be rack mounted. Finally, the RL6000 is very competitively priced, so your dollars go a long way, too. So see how it can enhance your LANs. Call 800 888-LAN1 or write SIECOR Corporation, Electro Optic Products, P.O. Box 13625, Research Triangle Park, NC 27709.

SIECOR

Military group sets out on net mission

continued from page 19

improve customer service. For example, a customer could make a payment on a lay-away purchase from any site on the base supported by the minicomputer. In addition, any POS terminal will be able to support credit card or check verification, which today are only supported in select locations.

Fiscal helper

IGLAS is intended to integrate all fiscal data — including budgets, store records, costs and pricing data — into a single program, Heaberg said. Today, those functions are handled by separate hardware and software packages that have evolved over the years.

"Right now, it takes us 30 to 60 days to tabulate the results from a store," he said, because it is a paper-intensive process that involves several levels of verification. "With IGLAS, monthly store results will probably be done within three days of the end of a fiscal period."

That will allow the exchanges to keep less inventory on hand and more efficiently plan staffing requirements, Heaberg said.

The VSAT net that will support these functions will replace a network based on NCR Comten remote communications processors and leased lines, said Bob Harper, telecommunications systems specialist for AAFES.

NCR Comten processors are currently located at 10 geographically disbursed sites and act as concentrators for 9.6K bit/sec lines that support IBM 3174 cluster controllers at surrounding PXs. Trunk lines varying in speed from 19.2K to 64K bit/sec link the NCR Comten processors to each other and to the headquarters here.

With the VSAT net, most of the NCR Comten processors will no longer be needed because VSATs located at each base will transmit data directly to Hughes' shared hub in El Segundo, Calif. One processor will be retained to support international links, which are not currently slated to be brought onto the VSAT net.

To transmit data from El Segundo to the Dallas headquarters, AAFES will install a single T-1 link.

A pilot test with five sites on the VSAT network is under way, and the network is expected to be completely operational by June 1991, Spires said.

According to Heaberg, the ASAP and IGLAS projects should be fully operational by early 1992. ■

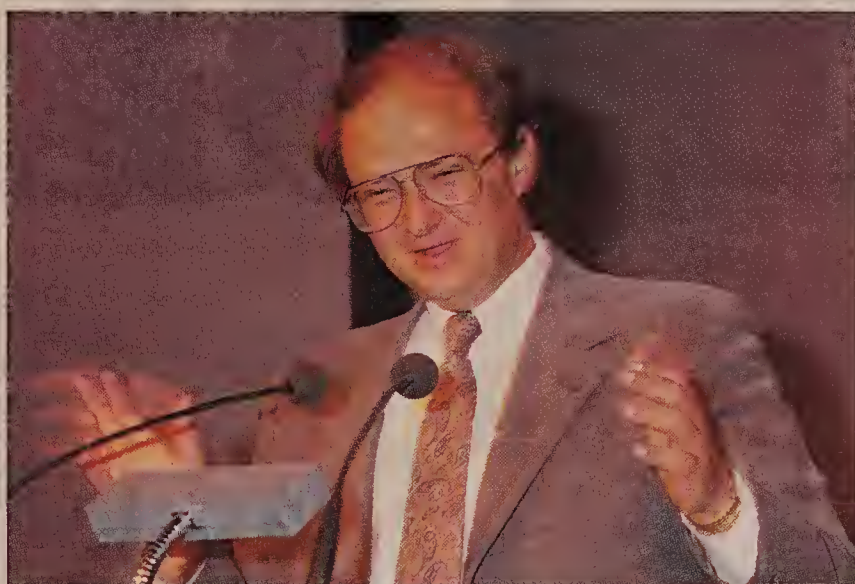
LOCAL NETWORKING

PC AND TERMINAL-TO-HOST LANS, GATEWAYS AND MICRO COMMUNICATIONS PRODUCTS

Worth Noting

“If OEM sales volumes [of OS/2 LAN Manager] aren't satisfactory by mid-1990, Microsoft will have to reevaluate its position and consider complementary distribution methods.”

Mike Murray
Director
Networking Business Unit
Microsoft Corp.
Redmond, Wash.



Apple's Morris Taradalsky

Potential buyers point out Mac's network gains, flaws

Connectivity announcements heighten popularity.

By Sarah Vandershaf
West Coast Correspondent

ORLANDO, Fla. — A number of the 350 information managers who attended a recent Apple Computer, Inc. seminar here said the vendor's June networking announcements have helped make Macintoshes viable additions to corporate networks.

Seminar attendees, many of whom were evaluating whether to buy their first Macintosh systems, said Apple's introduction of a Macintosh token-ring interface and its support for network standards have helped buoy Apple's credibility among corporate buyers.

One potential Macintosh buyer, an MIS manager who requested anonymity, said employee demand for Macintoshes is making him look more closely at Apple's networking offerings.

“People look at Macs and say, ‘I'd love to have that,’ ” one MIS manager said.

▲▲▲

“People look at Macs and say, ‘I'd love to have that,’ ” he said of the microcomputer's user interface. Until now, however, the lack of practical products to tie Apple devices to mainstream Ethernet and token-ring networks has taken precedence over user pleas for the hardware, the MIS manager said.

Morris Taradalsky, vice-president of customer service and information technology for Apple, said that for most users of IBM networks, the “most significant issue has been the lack of token-

ring connectivity, which [we have] addressed with our TokenTalk NB Card.”

While many show attendees agreed with Taradalsky, some users said Apple has some holes in its current connectivity strategy.

Waiting for action

Action Products International, Inc. of Ocala, Fla., which manufactures and imports aerospace-related novelties such as freeze-dried “astronaut ice cream” for museum gift shops, would like to combine the graphics capabilities of its 15 Macintoshes with the company's accounting, inventory and sales data bases residing on an IBM System/36 minicomputer to produce sales graphs, price lists and a product catalog.

John Sible, who manages Action Products' network, is considering two networking alternatives. Apple's TokenTalk NB Card would allow him to connect the Macintoshes over a token-ring net with the System/36. But he would either have to buy a \$1,250 interface for every Macintosh or buy one card for a Macintosh and dedicate it as a server — an expensive move either way, he said.

The other option would be to purchase a protocol converter and terminal-emulation software for each Macintosh, which would cost \$1,295 for the whole setup.

Although both options would only support AppleTalk's 230K bit/sec transmission speed, the limitation does not deter Sible. The Macintoshes would communicate mainly with the System/36 rather than with one another, so the higher 4M bit/sec speed of TokenTalk would not be essential, he said.

But Sible believes that Apple could offer a better option than the two from which he must now choose. If Apple were to add 5250 terminal emulation to its (continued on page 24)

Microwave technique extends E-net links

NEARnet, vendors devise way to split signal to allow distances of up to 8.6 miles between nets.

By Laura DiDio
Senior Editor

BOSTON — Members of the fledgling New England Academic and Research network (NEARnet) and two vendors have developed a way to double the reach of a single microwave span used to link remote Ethernets.

The technique enables users to link Ethernets at distances up to 8.6 miles while retaining compatibility with the IEEE 802.3 specification.

Previously, microwave could only be used to bridge Ethernets at distances up to 4.3 miles without using relays.

NEARnet, formed in late 1988 by Harvard University, Boston University (BU) and the Massachusetts Institute of Technology, is a nonprofit regional net that will eventually support connections to similar nets in six states.

The group currently has 12 members located in a 50-mile radius. Besides the university founders, other NEARnet members include Digital Equipment Corp., Thinking Machines Corp. and Encore Computer Corp.

Twelve-mile link

NEARnet and Microwave Bypass Systems, Inc. technicians recently linked MIT Lincoln Laboratory's Ethernet with the school's main campus network in Cambridge, Mass., 12 miles away via a microwave connection using only one repeater.

The 12-mile link, which supports a full 10M bit/sec Ethernet bandwidth, uses a single repeater between the two campuses that breaks the transmission into a

four- and an eight-mile segment.

The microwave technology enabled NEARnet to cut its network costs by about 40% over traditional microwave techniques, which would have required another hop, according to Kent England, director of networks and systems engineering at BU and a cofounder of NEARnet.

Further, unlike dial-up and leased-line services, users that purchase microwave equipment only incur onetime purchase costs, rather than recurring monthly usage charges.

Traffic patterns

NEARnet engineers developed the microwave link with Microwave Bypass of Braintree, Mass., and Cisco Systems, Inc. of Menlo Park, Calif. They discovered a way to extend the microwave reach by splitting a 23-GHz microwave signal into two channels and devoting each channel to one-way data traffic, one channel to send and one to receive, according to Microwave Bypass President David Theodore.

Microwave is inherently a full-duplex medium, capable of simultaneously sending and receiving data packets. But the 23-GHz radios have enough capacity to support two 10M bit/sec Ethernet channels, Theodore said.

With ordinary full-duplex microwave links that exceed four miles, the data transmission delay surpassed the maximum allowed by the IEEE 802.3 standard.

Consequently, users experienced undetected collisions that (continued on page 24)

HLS unveils file servers, software

By Susan Breidenbach
West Coast Bureau Chief

MOUNTAIN VIEW, Calif. — Hughes LAN Systems (HLS) recently unveiled a new line of file servers and protocol software that expands the workstation types and cabling options the firm supports on local networks running Novell, Inc.'s NetWare 2.15.

Software drivers built into the new servers support HLS' broad-

band Ethernet and token-ring adapters, as well as Novell's NE2000 Ethernet and NL1000 AppleTalk boards. This lets users mix and match four cabling options, and attach Macintosh workgroups as well as personal computers to HLS local networks.

The new 4450 and 4460 servers, which come with NetWare 2.15 installed, are based on Intel Corp.'s 25-MHz 80386 microprocessor. Novell's NetWare For Macintosh, a server-based application that provides NetWare services to Macintosh workstations, is available from HLS as an option for the 4460.

The two servers are available in a total of seven models ranging in price from \$8,995 to \$17,995. (continued on page 24)

Netnotes

Novell, Inc. has certified disk drive maker Priam Corp.'s external and internal storage subsystems for use with its Advanced NetWare and System Fault Tolerant NetWare 286 Version 2.15 network operating systems. Novell tested and approved more than 50 storage subsystems ranging in size from 45M to 330M bytes. Priam said its drives are Novell-ready, meaning they are outfitted with a defect map that instructs the network operating system of nonusable storage addresses on the hard disk. Previously, NetWare users were required to use Compurf, a Novell disk utility to spot disk drive defects. Priam said it will also support future versions of NetWare, including NetWare 386.

IMC Networks Corp. recently announced a hub to connect workstations fitted with Ethernet local network cards to an Ethernet backbone in a star topology.

The PCnic Basket hub, in its basic configuration, contains a mainboard card, an attachment unit interface that connects the backbone to the hub and a two-port interface card supporting connection of two workstations to the hub. As many as four additional two-port interface cards can be added to the hub, supporting a total of 10 workstations.

PCnic Basket hubs can be stacked for multiple connections to the Ethernet backbone. The hub supports connection of thin or thick (continued on page 24)

The ISDN

Showcasing ISDN applications

BY JEAN S. BOZMAN
CW STAFF

SCOTTSDALE, Ariz. — AT&T last week drew major computer vendors into its quest for MIS and telecommunications support for ISDN technology.

After years of preparation, AT&T is now able to showcase Integrated Digital Network (ISDN) equipment from such manufacturers as Tandem Computers, Equipment Corp. and Wang Laboratories.

AT&T executives demonstrated

that gathers calls from multiple user locations — even those in an IBM Systems Network Architecture environment.

ISDN applications come alive at ICA

Dawn Bushaus, Assistant Editor

Vendors at the International Communications Association convention last week showcased ISDN applications history when they demonstrated a live ISDN network using

ISDN STEALS SPOTLIGHT AT ICA SHOW

Twenty thousand people and more than 300 exhibitors are expected at the Dallas extravaganza April 30-May 5.

More than 300 exhibitors and an anticipated 20,000 people will flock to the Dallas Convention Center the week of April 30-May 5 for the 42nd Annual ICA Conference and Exposition.

AT&T To Let Telcos Offer Users Free ISDN

BY BETH SCHULTZ

SCOTTSDALE, ARIZ. — AT&T Network Systems last week said it will give its telephone company customers the chance to provide their users with free ISDN service on a trial basis.

AT&T introduced its Customer Opportunity Program at last week's NetPower '89 trade show here, which featured AT&T central office equipment and third-party supplied applications for integrated services digital networks (CommunicationsWeek, March 13).

AT&T Network Systems' new program is a two-pronged offering that will let the company's Bell operating company and other telco customers introduce end users to ISDN—at no extra charge.

under which telcos, end users are developing ISDN applications. Although AT&T's program was the centerpiece of the NetPower event, it was not the only highlight.

Robert Cooper, executive director with Rochester Telephone Corp., N.Y., said, "Rochester Telephone is essential to the success of the ISDN program. We are interested in NetPower, a center of its access to AT&T SESS switchgear. AT&T put together applications that are applicable to service providers.

'A try it; you'll like it' may be the

AT&T confirms, expands ISDN commitments

BY BETH SCHULTZ

SCOTTSDALE, ARIZ. — AT&T Network Systems plans to showcase 11 new ISDN applications for telephone companies and business customers at the first NetPower '89 ISDN forum here this week.

Although AT&T in the past has been involved in forums covering integrated services digital networks, NetPower '89—AT&T's own event—is different, an AT&T spokeswoman said. The company will highlight industry-specific solutions it developed in cooperation with local telephone companies and third-party vendors.

"This is a way to explain to telcos and end users how ISDN centers can make the PC [local area network] more productive," she said. Each of the 11 applications will be demonstrated in settings that depict elements typical of that environment, including customer premises equipment. The security application, for instance, will include a security guard application, a security supervisor office and a central se-

An ISDN Opportunity

EDITORIAL

technology. But oddly enough, the consultant. What AT&T attendees at NetPower '89, AT&T telecommunication. Admittedly, the program is a

AT&T, others offer ISDN products at ICA

By John Cox
Senior Editor

SCOTTSDALE, Ariz. — AT&T last week demonstrated a battery of new and existing Integrated Services Digital Network products at NetPower '89, an exhibit

features such as Income Line Identification. \$995, the product will be available in April. NetLine, Inc.

ICA ISDN Demo: NetPower

EDITORIAL

There was a lot of talk and, actually, a lot of action about ISDN at the International Communications Association conference in Dallas last week.

ICA ISDN showcase, Bell Telephone Co., and other ISDN technology.

At times during the Southwestern Bell conference, the importance of ISDN work, or, at the least, a week ago. Microcom Inc. officials said the AT&T SESS demo wasn't working. Some fine-tuning was needed. More than fine-tuning for the show.

AT&T To Spotlight 11 ISDN Applications

NETPOWER '89 PARTICIPANTS	
VENDOR	PRODUCT
DEC	DEC VAX/VMS
IBM	IBM PC, PS/2, and other IBM products
Microsoft	Microsoft Windows and other software
Novell	Novell NetWare and other network software
Prologix	Prologix videoconferencing equipment
Sequent	Sequent VME and other hardware
Spacelab	Spacelab medical equipment
Tandem	Tandem non-stop systems
Wang	Wang computers and software
Yankee	Yankee data processing equipment

AT&T spokeswoman said. In addition to the demonstrations, 27 ISDN products are being shown for the first time at NetPower '89. Prologix Service, its videoconferencing spokesman for the ISDN program, said. With an ISDN connection, a telephone service could be transmitted. Although the ISDN switch in NetPower can do "ISDN delivery" of the Newbridge forum to show provides network connected program for disrupting ISDN. The ISDN 150 Basic Communications US West. The list of companies removed.

Scorecard

(Part 2)

ity Calls

Campaign was started with little fanfare. It left this significant information out of both programs presented at NetPower. It's telling consultants, the press, all the... is that ISDN is here, now. With its... beyond just getting the message out. The... has put its money where its mouth is... motion is a risk. The Customer Opportu... leaving AT&T wait-high in the ex... ISDN as trial users go back to plain old... the offer ends. No matter the results, the... to telcos: If they sell ISDN, AT&T

... big users, and into... at NetPower is

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no
The ISDN R-Se... \$995 and is avai... Other vendor... to announce ISD... terface support fr... ucts. Among then... ware Link, Inc. of... which announced... an

at Feat
day ISDN network creation, the... driving the display must have... that the demonstration wouldn't... there would be glitches... network setup was winding down... used to problems. Microcom found... connected to Microcom gear in the... like the AT&T 5ESS switch that... is home base in Norwood, Mass... to get the display humming an... be needed to get ISDN up and... ations community. Pav of

ations

icipating in the applications... will display ISDN-comput... products will be on display... are modifications of non... for example, is demonstrating... an ISDN connection... a... Plains, N.Y. company said... n, he said. Prodigy's services... r than with traditional plain old... it and modem connections... v has the capability to link with... not done so yet, and is participat... ally as an example of what ISDN... one of several alternatives for... the spokesman said... a Inc., Herndon, Va., will use this... C software package, IS-Net, which... capabilities for personal computers... AT&T 7500 ISDN terminal sets. The... bers networking capabilities without... rating system operations... ns at the show will be supported by... terface lines provided by US West... the telephone company subsidiary of... enver... run over intraoffice facilities from the... ills 5ESS central office in Phoenix to a... unit located in Scottsdale, said Robert... vest Communications' product manager... ey rate.

Who's really putting ISDN on the map? If you've seen the headlines, you know the score.

You only have to scan the trade press to see who's the clear-cut ISDN leader. The company that helped build the standards for ISDN. The company that's helping local telephone companies turn the promise of ISDN into Real-World Solutions. The company: AT&T.

95% of ISDN lines are on an AT&T 5ESS® switch

AT&T Network Systems has helped more local telephone companies install more ISDN lines than any other telecommunications supplier—some 95% of non-trial ISDN lines. What's more, we've already shipped over 260,000 ISDN lines for future use.

Today, 162 central offices can offer operational ISDN services from the AT&T 5ESS switch—with 618 upgraded with ISDN software. Combined, these central offices have the potential to offer ISDN services to 13.5 million telephone company customers.

So, while most other suppliers are still in product development trials,

AT&T Network Systems is helping phone companies across the nation offer Real-World ISDN services right now. Services such as simultaneous voice and data transmission, high-speed facsimile and electronic mail—all over a single phone line. Services that utilize your existing telephone network to dramatically increase productivity and efficiency for businesses, from hospitals and insurance companies to investment, publishing and law firms.

ISDN is just the beginning

We believe that ISDN is the beginning of an even bigger future. A future we call Universal Information Services. A future where networks will be able to meet complex communications needs for voice, data and image—simply and economically.

At AT&T Network Systems, this belief is already driving our technology, our product development, and our commitment to you.

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AT&T

The right choice.

HLS unveils file servers, software

continued from page 21

The minimum configuration is a 4450 with 2M bytes of system memory and a 383M-byte hard disk, while the high end is represented by a 4460 with 8M bytes of random-access memory, dual 383M-byte hard drives and a 150M-byte tape backup drive.

The 4450 and 4460 join HLS' existing 4430, which has a 16-MHz 80386. HLS has discontinued the 4430 but will continue to support it with software upgrades to new versions of NetWare.

Protocol moves

HLS' new Linc/PS2 software, a DOS application that runs in workstations, provides support for IBM's Micro Channel Architecture-based Personal System/2s. The software includes drivers for Western Digital Corp.'s Micro Channel EtherCard Plus adapter and IBM's Micro Channel broadband board.

The new Linc/PS2 software is an extension of HLS' Multiple Protocol Architecture (MPA), joining the Linc/PC software for workstations based on IBM's original Personal Computer architecture. The Linc line of MPA software puts multiprotocol support in the workstation, rather than in the server or gateway.

According to K.C. Clawson, manager of HLS' personal computer product line, there are performance gains to be had by distributing the protocol processing out to the workstations rather than handling it on gateways or with server-based protocol

multiplexing.

"The Linc software in the workstations is what makes our servers really fly," Clawson said.

The basic Linc/PC and Linc/PS2 packages support Novell's Internetwork Packet Exchange (IPX) transport protocol and can be enhanced to support optional protocol stacks, including Transmission Control Protocol/Internet Protocol, Digital Equipment Corp.'s Local Area Transport (LAT), IBM's Data Link Control (DLC) and HLS' proprietary LocalNet 2000 transport protocol.

"Our goal is to eliminate gateways as much as possible," Clawson said. Gateways are costly, represent both a performance bottleneck and a single point of failure, and often make protocol translation errors, he added.

Separately, HLS also reduced prices on its Multiple Protocol Terminal Server family by 10% to 50%, and enhanced the product line with two new options.

Users can now purchase "read-only memory-loaded" terminal servers which can store the terminal's operating software in erasable programmable ROM chips. HLS' existing terminal servers must boot up across the network from a dedicated DOS-based personal computer containing the operating software and running a downline-load protocol.

The second enhancement is a third protocol stack for the Linc/Term multiprotocol software that runs in the terminal servers. Users can now add HLS' LocalNet 2000 protocol to the TCP/IP and LAT protocols already in the Linc/Term software. ■

Netnotes

continued from page 21

Ethernet and coaxial cable.

Interface cards that support twisted-pair and fiber-optic cable will be available in the future.

The basic PCnic Basket configuration, including power supply, costs \$1,395, and each extra two-port interface card is \$450. With the full configuration of five two-port cards, PCnic Basket costs \$2,995.

The PCnic Basket hub will be available at the end of September. IMC Networks can be reached at 1342 Bell Ave., Unit 3E, Tustin, Calif. 92680, or by calling (714) 259-1020.

Standard Microsystems Corp. recently introduced an internal four-port hub for Arcnet in versions for coaxial cable or twisted-pair wire. The hubs fit into any IBM Personal Computer and do not require an external power source. As many as four hubs of either type can be daisy-chained in a single Personal Computer without use of external ports.

Each hub can support 2,000 feet of coaxial cable or 400 feet of twisted-pair cable between networked devices. Hubs include diagnostic displays at each port for fault isolation.

In addition, the twisted-pair hub has a display showing if the wire's polarity has been reversed during installation.

The coaxial hub is priced at \$295, and the twisted-pair version costs \$345.

Standard Microsystems' Systems Products Division can be reached at 35 Marcus Blvd., Hauppauge, N.Y. 11788, or call (516) 273-3100.

Ten X Technology, Inc. last week introduced the Optical Conversion Unit (OCU) for a Write Once, Read Many (WORM) optical disk, which can be used to permanently back up network application programs.

The OCU makes a WORM disk appear as a Winchester drive to a server so the disk can be read without software drivers.

Although the data stored on WORM disks cannot ordinarily be altered, the OCU is able to relocate blocks of data on the disk so stored applications can be updated.

The OCU is priced at \$1,295 and is available now.

Ten X Technology can be contacted at Bldg. 3, Suite 3200, 4807 Spicewood Springs Road, Austin, Texas 78759, or call (800) 922-9050 outside Texas or (512) 346-8360 inside Texas. ■

Potential buyers point out Mac's gains

continued from page 21

Coax/Twinax Card, "that would be the ideal solution for us," Sible said. Currently, Apple's Coax/Twinax Card only supports 3270 emulation.

Chemical reaction

Gary Turner, systems analyst for the Latin American division of Dow Chemical Co., is looking to use Apple networking products to integrate IBM Personal Computers into a Macintosh network.

The division, based in Coral Gables, Fla., bought 17 Macintoshes for word processing in February, opting for them over DOS-based personal computers primarily due to the Macintosh graphical interface, Turner said.

"We're seeing a large proliferation of IBM [Personal Computers] on Token-

Microwave technique extends E-net links

continued from page 21

randomly destroyed data packets and adversely affected network performance, England said.

Splitting the transmit and receive signals was a surprisingly simple and feasible matter, he said. Users no longer are constrained to the single-hop, 4.3-mile limitation and can transmit data at the 8.6-mile maximum distance of microwave while conforming to 802.3.

Once the signal passes through Microwave Bypass' Etherwave Transceiver — a local net-to-microwave interface — it goes through a router that joins the channels for full-duplex transmission across the local Ethernet.

"We had this crazy idea that it was technically possible to extend the distance between remote local Ethernets beyond the four-mile point and at the same time avoid undetected collisions," BU's England said.

Splitting the signal, however, did create a small problem. Internetwork routers, which are used to direct traffic among remote Ethernets, do not recognize one-way data traffic. Routers are traditionally configured to send and receive all information about data packets on one Ethernet line.

So Cisco Systems, which supplies many of the routers for NEARnet, modified the software on its AGS/2 internetwork router to understand and accept the two separate one-way, serial-line Ethernet signals, England said.

"The trade-off is that we've had to use two Ethernet interfaces on each router to achieve the equivalent full-duplex transmission path," England said.

Breaking ground

Doug Gold, manager of communications industry research for local networks at market research firm International Data Corp. in Framingham, Mass., said users have traditionally shied away from running Ethernet transmissions over microwave because they didn't think it could get the full 10M bit/sec Ethernet speed.

"This not only proves them wrong, but it breaks new ground. It lets users transfer huge amounts of data over previously impossible distances within seconds," Gold said.

With the trial of the new microwave technology, NEARnet becomes the first network to extend the distance between Ethernet segments up to eight miles, England said. ■

Rings," Turner said. "My gut feeling is that we're going to have to tie [the Token-Rings and the Macintosh nets] together eventually."

The Macintoshes are networked to one another over phone wiring using Berkeley, Calif.-based Farallon Computing, Inc.'s PhoneNET. They access the division's IBM mainframe through MacIra 3270 terminal-emulation boards supplied by Digital Communications Associates, Inc. of Alpharetta, Ga.

Turner has not yet decided on a strategy for doing this. But if in the future the division implements token rings with IBM Personal Computers as well as AppleTalk networks of Macintoshes, he may link them via a gateway.

Turner said he may eventually use one of Apple's Ethernet or token-ring adapters to connect the Macintosh systems to a faster local network in order to allow Macintoshes to access a data base. ■

One Easy Step to a Healthier LAN

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MANAGEMENT STRATEGIES

MANAGING PEOPLE AND TECHNOLOGY: USERS GROUPS AND ASSOCIATIONS

Dialogue

Now that 16M bit/sec token-ring products that use unshielded wire are coming out, do you see any reason for users to buy 16M bit/sec token-ring networks that use shielded wire?

“Only in areas with a high level of noise, such as manufacturing plants. Places like that can certainly benefit from the extra shielding on IBM cabling.

“Of course, another factor is distance. If you have to run a large distance, say 800 feet or so, you probably wouldn't want to look at unshielded twisted pair. However, in most government and business situations, I think [unshielded wire] is an excellent way to go. There is quite a cost savings with it.”

Ed Peters

Communications engineer
State of Florida
Communications Division
Tallahassee, Fla.

“I would say yes, for select cases where there's a lot of interference. We have copiers and other items — lighting and what not — where interference is enough that unshielded [wire] shouldn't be used.

“It would really be in the best interest of my company to go ahead and get the shielded [wire] in there ahead of time. People and equipment move around so much that it would be foolish for us to get shielded in one area and unshielded in the rest and find out after we move people around that we're going to need more shielded.”

Stephen Larson

Systems analyst
Smith-Corona Corp.
Cortland, N.Y.

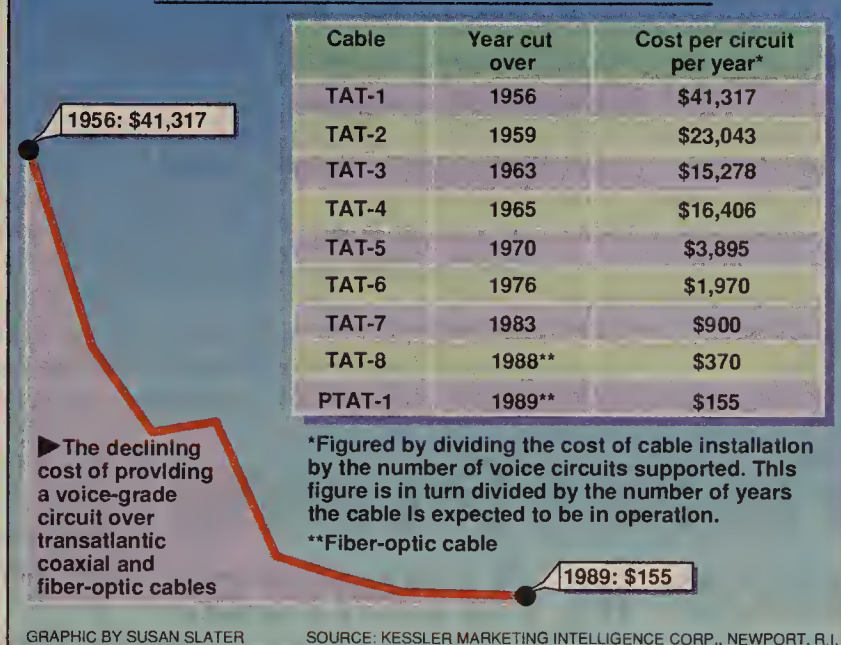
“No, I don't think it's necessary to wire with the shielded twisted pair because I believe the technology on copper wire has advanced to the state where 16M bit/sec is practical on unshielded twisted pair.

“In fact, I chose two years ago not to have a building wired [with shielded wire] for that reason. I heard glimmers of 16M bit/sec token ring coming out on unshielded twisted pair. Since they could do Ethernet at 10M bit/sec, I didn't see why it couldn't be stretched a little further to 16M bit/sec.”

Frank Fore

Assistant manager
Central computer facility
Southwest Research Institute
San Antonio, Texas

Cost of providing international service declines



Users can save a bundle by buying into undersea fiber

Investment in capacity an alternative to leasing.

By **Barton Crockett**
Senior Editor

NEWPORT, R.I. — Looking to cut international communications costs? Consider buying your own undersea fiber-optic cable.

According to Sunil Tagare, director of the undersea consulting group at Kessler Marketing Intelligence Corp., a consultancy here, some users can save a bundle of money by buying capacity on undersea fiber-optic cables instead of leasing circuits.

The reason, according to Tagare, is that carriers charge a premium for international transmission services.

“Undersea fiber-optic cables are an extremely lucrative business for carriers,” Tagare said. “Users don't have to pay these prices if they buy their own facilities.”

Declining cost

While prices are declining for international communications, Tagare figures that the price reductions do not fully reflect the lower cost of providing service over undersea fiber cables.

By dividing installation cost by total capacity, Tagare calculates that the cost to carriers of supplying a single voice-grade circuit over Trans-Atlantic Telecommunications-7 (TAT-7), a copper cable cut over in 1983, is \$700 per year.

Tagare estimates that the carrier's cost for a single voice-grade circuit over TAT-8, which was cut over late last year, is \$370 per year. The cost of a similar circuit on Private Trans-Atlantic Telecommunications-1 (PTAT-1), which is scheduled to begin trial operations this month, is \$155 per year (see graphic).

Carriers have passed some

savings along to users. Dedicated 56K bit/sec AT&T circuits on TAT-8, for example, cost less than half as much as comparable circuits on TAT-7.

Tagare figures undersea fiber cables will drive down prices for all international communications services. Depending on the area of the world served and the media used, Tagare predicts prices will decline an average of 22% to 40% by 1996.

Fat margins

Even so, the price cuts won't equal the amount carriers save by using undersea fiber cables.

“Carriers were making fat margins on copper-based cables, and they're making even fatter ones on fiber-optic systems,” Tagare said.

Users that need a few dedicated circuits might be better off buying into an undersea cable, an investment that could be recouped within as few as two years, Tagare estimates. Tagare added that users could resell excess capacity at a premium price to other users.

Users acquire capacity in cables by joining consortiums formed to build them.

According to Tagare, several investment companies and users are considering joining such consortiums. One consortium, which Tagare said doesn't plan to publicly announce its activities until later this year, will let users buy a handful of voice-grade lines for an investment of as little as \$100,000.

Tagare, who said his firm plans to help this consortium find investors, declined to specify where the cable will be laid or exactly how much capacity users could buy. □

MANAGEMENT PROFILE

BY SALLY VANDERSHAF

Law firm drafts an unusual LAN plan

LOS ANGELES — Although management at the law firm of Buchalter, Nemer, Fields and Younger thought a local network would be ideal to support the microcomputers that were spreading throughout the company, they were wary of the complexity of network operating systems.

In an effort to minimize retraining, the firm decided instead to install a network that retains familiar DOS commands, an example of a little-discussed alternative to technically overbearing network operating systems.

Initially, the firm linked 16 personal computers in its word processing department to laser printers using 10NET Communications' 10Net software. The software enables the DOS on each workstation to support various electronic mail, file-sharing and other applications across the net.

Lester Levine, director of information services for the firm,

said he “never liked networks” produced by Novell, Inc. and 3Com Corp., which generally require servers and impose new operating procedures on users. The 10Net product, on the other hand, does not require a server.

The software enables the DOS on each workstation to support various applications.

The 10Net software runs on top of DOS on personal computers in the network. Levine was already familiar with DOS and did not want to learn a network operating system.

(continued on page 26)

BOOK REVIEW

BY ERIC SCHMALL

Profiting from a career management manifesto

Designing and Managing Your Career: Advice From the Harvard Business Review, edited by Harry Levinson (Boston: Harvard Business School Press, 1989), \$29.95.

Communications managers who never seriously contemplate career management not only limit their own potential, but also that of their staffs.

While serious career planning can be a full-time job, network managers can get a good start by reading *Designing and Managing Your Career: Advice From the Harvard Business Review*. Harry Levinson has compiled 30 articles published by the *Harvard Business Review* that offer career advice useful to managers of every kind, including network managers.

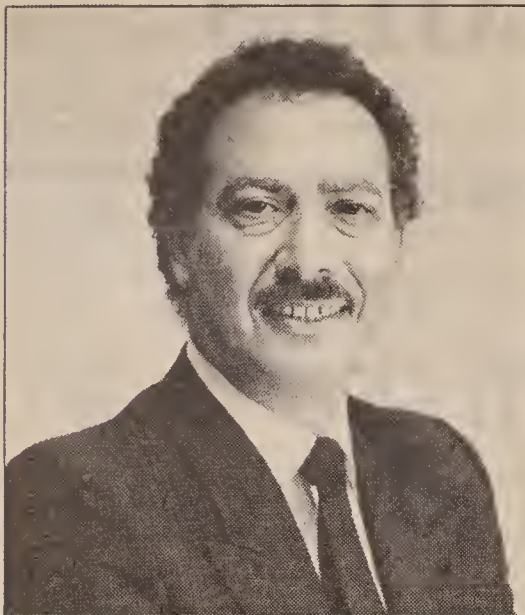
The articles discuss a number of important topics, such as what makes an effective administrator, how effective managers take charge and the use and misuse of power. Also included are profiles of successful managers.

Many articles offer provocative concepts. For instance, author Abraham Zaleznick finds that traits that make a good leader differ from those that make a good manager. Good managers tend to be conservative, risk-averse problem-solvers, Zaleznick writes. Good leaders, by contrast, take risks and behave more entrepreneurially. The role an individual should play depends on the specific company: Some companies want entrepreneurs and leaders; others simply want good managers.

In another article, author John Veiga debunks the age-old

(continued on page 26)

Schmall is network systems manager for an insurance holding company.



Lester Levine

Law firm drafts an unusual LAN plan

continued from page 25

ating system or put his users through a training ordeal, he said. Thus, 10Net "seemed to resolve my problems without [us] having to relearn the world all over again," Levine said. "We found it was such a good network that we decided to extend it further."

The firm now links approximately 450 personal computers using the software and has even integrated an IBM System/38 minicomputer into the net to support custom applications. In fact, the network isn't so local anymore. The firm has installed subnets at remote offices in San Francisco, San Jose and Newport Beach, Calif.

At each of the four sites, personal com-

puters from Everex Systems, Inc. and AST Research, Inc. are outfitted with 10Net interfaces and linked in a 1M bit/sec Ether-

Thus, 10Net "seemed to resolve my problems without [us] having to relearn the world all over again," Levine said.

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net star-wired topology using twisted-pair wiring. Western Digital Corp. hubs are used to support as many as 10 nodes and

are daisy-chained to other hubs.

The firm has developed a billing system for the System/38 minicomputer in Los Angeles to track the amount of time partners spend on particular accounts. Billing information from personal computers on the local net at each of the four sites is entered into an IBM System/36 minicomputer, which is also on the network, and sent to the System/38 via a dedicated 9.6K bit/sec data line.

Two IBM Application System/400 minicomputers will replace the System/36 at the firm's Los Angeles office in the near future to increase the number of users that can be on the network, Levine said.

The local networks, which Levine began installing in June 1988, are now up and running at all four sites. The San Francisco and San Jose branches are linked to the main office, and the Newport Beach site will be connected in September, Levine said. In the future, the firm will relocate its main office to a new site in Los Angeles.

Because of the high costs of office space at the new site, the System/38 will be housed in a separate building. Levine said he may connect the System/38 to the new main office with a 10M bit/sec fiber-optic backbone once the move is made.

He also said the 9.6K bit/sec line linking the Los Angeles main office with the remote sites would probably be replaced eventually by a T-1 line. ■

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Profiting from career management

continued from page 25

myth that relocating helps managers climb the corporate ladder. For years, people have been led to believe, often by their employers, that accepting frequent transfers wins brownie points among upper management and gives valuable experience. However, according to Veiga, the importance of relocating has been overplayed. Veiga supports his contention with an in-depth study of corporate managers.

Editor Harry Levinson also contributes some interesting essays. In one, Levinson advises organizations on how to deal with career-plateaued, middle-aged managers. Levinson argues that companies should

Managers often unconsciously work to ensure that their successor can't effectively replace them.

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use these individuals to help develop the talents of younger employees.

In a later essay, Levinson argues that managers should never select their own successor. The reason, according to Levinson, is that managers often unconsciously work to ensure that their successor can't effectively replace them. Levinson recommends that independent committees select successors.

The book never claims to offer easy recipes for career success. At best, it offers a series of challenging thoughts rooted in sound research on all aspects of career management. From these concepts, network managers can take positive steps in shaping their own — and their staff's — future professional success. ■

PRODUCTS & SERVICES

THE LATEST OFFERINGS FROM VENDORS AND CARRIERS

Worth Noting

See inside for:

- A CSU/DSU from Integrated Network that supports all rates.
- Progressive Computing's enhanced analyzer.
- Pitney Bowes' new junk fax lockout feature for facsimile machines.

First Look

Telenex analyzers support BRI, PRI

Telenex Corp.'s AR Division recently enhanced its line of protocol analyzers by adding support for the Integrated Services Digital Network Basic Rate Interface and Primary Rate Interface.

The **Interview 7000 Series** includes the Interview 7000 and Interview 7500, which are based on the Intel Corp. 80286 microprocessor. The earlier products can be used to test X.25 and IBM Systems Network Architecture protocols, as well as asynchronous and Binary Synchronous Communications protocols. With new line interface hardware and software, the 7000 Series can be used to analyze and test both the subscriber's Basic Rate Interface line and the Primary Rate Interface trunk circuits.

In order to access multiple channels on Basic Rate Interface and Primary Rate Interface lines, the dual-channel system demultiplexes the channel, breaking it out into B and D channels. From there, users can monitor for conditions such as synchronization.

A layered architecture enables the 7000 Series to perform tests at specific layers of the Open Systems Interconnection model. For example, at Level 3, users can test Q.931, which is the protocol for ISDN Level 3 user-to-network signaling.

The Interview 7000 Series offers two 1.4M-byte floppy disks. A 20M-byte hard disk that comes standard with the Interview 7500 is a \$950 option on the Interview 7000.

The ISDN interface card is *(continued on page 28)*

New PC fax products make debut

By Tom Smith
New Products Editor

Brooktrout Technology, Inc. and GammaLink, Inc. recently introduced personal computer facsimile products. Brooktrout Technology unveiled a card that supports two fax lines, and GammaLink rolled out a Micro Channel Version of its GammaFax Communications Professional (CP).

Brooktrout Technology's TR-112 Twin-Channel Fax Card is an IBM Personal Computer AT-compatible board with two transceivers that supports simultaneous transmission and reception of fax documents, according to Eric Giler, president of the company.

Each TR112 channel has a direct memory access chip that handles transfer of information from the personal computer's host memory in blocks of up to 384 bytes.

Other fax cards rely on the host processor to transfer information one byte at a time, which puts more of a burden on the host, Giler said.

Optional circuitry supports direct inward dialing (DID), enabling fax servers on local networks to identify the intended recipient of a fax and deliver it accordingly.

In this environment, one channel would typically support DID for incoming faxes, while the other would be dedicated to outbound faxes. The product also enables electronic mail users to

send messages to Group III fax machines.

The TR112 is available now. The basic model is priced at \$1,995; the version with auto-routing circuitry costs \$2,495. A 64K-byte buffer option is priced at \$300.

An optional digital voice response capability, expected to be available by the first of the year, will enable users to implement integrated voice response/fax applications.

Brooktrout Technology can be reached by writing to 110 Cedar St., Wellesley Hills, Mass. 02181, or by calling (617) 235-3026.

GammaLink's GammaFax CP Micro Channel is designed for IBM Personal System/2 Models 50 and above.

It can accommodate high-volume usage, with as many as eight boards in a single Personal System/2.

The product comes with application program interfaces (API) for the Command Language and GammaLink's GammaFax Command Language.

The Command Language API enables users to create applications for such tasks as sending and receiving faxes as well as soliciting status information. It is intended for stand-alone and network server environments.

The GammaFax Command Language API lets users develop more sophisticated applications that support fax switching functions, such as store-and-forward, and message broadcast.

The Micro Channel GammaFax CP is priced at \$1,195, including APIs and system software.

GammaLink can be contacted by writing to 2452 Embarcadero Way, Palo Alto, Calif. 94303, or by calling (415) 856-7421. □

Multi-Tech, NEC boost V.32 support

By Jim Brown
and Tom Smith
Network World Staff

NEC America, Inc. and Multi-Tech Systems, Inc. recently announced V.32 modem enhancements and products.

NEC America enhanced its N9631 modem by adding support for Microcom, Inc.'s Microcom Network Protocol (MNP) Class 5 data compression, doubling its transmission rate from 9.6K to 19.2K bit/sec.

The full-duplex N9631 has automatic speed detection so it can communicate with the installed base of older 300 to 2,400 bit/sec modems as well as new

9.6K bit/sec V.32 modems. In addition to V.32, the N9631 complies with V.22bis, V.22, Bell 212A and 103/113, and it supports all common transfer rates between 300 and 9.6K bit/sec.

The N9631 is a two-wire modem that offers synchronous and asynchronous operation. Support for the MNP Class 4 Error Control Protocol assures error-free communications. The modem uses quadrature amplitude modulation.

The N9631 costs \$1,095. The enhanced version with MNP Class 5 will be available in September. Current N9631 users can upgrade with an erasable programmable memory chip for \$150.

NEC America's Data and Video Communications Systems Division can be reached by writing to 110 Rio Robles, San Jose, Calif. 95134, or by calling (408) 433-1250.

Multi-Tech Systems recently *(continued on page 28)*

Account-A-Call adds support for Centrex

New addition to TADPoll family of data collection products can store up to 93,000 call records.

By Tom Smith
New Products Editor

BURBANK, Calif. — Account-A-Call Corp. recently expanded its Telephone Accounting Data Poll (TADPoll) line of call data collection devices by adding a version that can be used with Centrex.

Designed for users served by AT&T 1/1AESS switches, TADPoll CTX collects calling data and forwards it to a computer for processing, either at an Account-A-Call service bureau or on the user's premises.

A Centrex Station Message Detail Recording port on TADPoll CTX accepts X.25 Link Access Procedure (LAP) A data from a 2,400 bit/sec full-duplex synchronous link to the 1/1AESS.

TADPoll CTX, which has a 1M-byte memory, expandable to 2M bytes, can store up to 93,000 call records. The device is polled automatically if it reaches 85% of capacity.

Account-A-Call can access TADPoll CTX via a dial-up link for customers of its service bureaus. Other users can tap the device via an RS-232 port.

TADPoll CTX converts the X.25 LAP A data from the central-office switch to ASCII to make it compatible with the processing computer, according to Dick Minor, technical manager for Account-A-Call. This eliminates the need for a separate protocol conversion device, which is often used in Centrex call-accounting applications, Minor said.

The data stored on TADPoll

will typically include the time of day that calls are placed, duration of calls, number called and number of calling party, as well as the number of calls completed, incomplete calls, all trunks busy and calls abandoned.

A software component residing on the polling computer can be used to specify a certain type of call record sought by the user, such as calls from a given extension. This software also has an error-detecting protocol to resend blocks of corrupted data.

Huffman Code data compression is used to transmit data from TADPoll CTX to the polling computer at 2,400 bit/sec. The data is compressed by 65% to 70%, Minor said. TADPoll can record and poll simultaneously.

In addition to eliminating the need for a protocol conversion device, TADPoll CTX offers users other advantages over traditional Centrex call-accounting methods, Minor said.

One common technique is to store the data on magnetic tapes purchased from the switch provider. Those tapes, which are provided at the end of each month, require processing. TADPoll CTX will simplify this process and provide the data to users more quickly, Minor said.

TADPoll CTX, including a Racal-Milgo 2,400 bit/sec modem and software, is priced at \$4,490 and is available now.

Account-A-Call can be contacted at 4450 Lakeside Drive, Suite 300, Burbank, Calif. 91505, or call (818) 846-3340. □

AT&T upgrades Merlin, enhances speakerphones

PARSIPPANY, N.J. — AT&T recently announced an upgraded version of its Merlin digital key system that supports tie lines and automated attendant capabilities. The carrier also introduced a multiline telephone and two speakerphone modules.

AT&T's Merlin II Release 3 can now be connected via a tie line to a remote private branch exchange or another Merlin system. This capability allows users to call colleagues in remote offices by dialing a prefix and then an extension number.

The latest Merlin model also supports an attendant feature

that answers incoming calls with a prerecorded message and instructs callers to use their push-button keypad to complete the call. For example, the "1" key could be designated for customer service, the "2" key for the credit department, or a caller could input the call recipient's extension.

More speed-dial numbers

Other new features include quick-dialing capacity for up to 130 numbers, in comparison with Release 2's 40-number capacity, and a posted message feature so users can leave one of 20 cus- *(continued on page 28)*

Brightwork enhances printer packs

By Susan Breidenbach
West Coast Bureau Chief

RED BANK, N.J. — Brightwork Development recently enhanced its printer utility software for Novell, Inc. local networks to provide features usually associated with print-spooling packages for mainframes or minicomputers.

Release 2.40 of the company's PS-Print software lets network administrators resequence jobs in a print queue, search for a text string to locate a print job that needs to be repositioned and put a print job on hold. It also includes indicators that show the size of a job and print job status.

Users are automatically notified if they attempt to submit a job to a printer that is off-line. They are also notified if a particular printer requires the user to choose one of several paper or form types on which to print.

PS-Print 2.40 lets network users share printers attached to any workstation on the network, not just those connected directly to servers. An improved pop-up printer-selection menu lets users change all printing options on the fly from within applications.

PS-Print 2.40 supports local networks running Novell's NetWare 2.10 and is priced at \$595 per server. It includes a printer configuration program that lets administrators assign

Users are notified if they attempt to submit a job to a printer that is off-line.

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user access privileges to the various printers on the network.

For more information, contact Brightwork Development at P.O. Box 8782, Red Bank, N.J. 07701, or call (201) 530-0440. **■**

Multi-Tech, NEC boost support

continued from page 27

introduced a dial-up modem board for IBM Personal Computers that complies with CCITT V.32 and V.42 standards.

The MultiModem932EC transmits asynchronous data in half- or full-duplex at speeds up to 9.6Kbit/sec. By utilizing the MNP Class 5 data compression technique, the modem can achieve an effective throughput rate of up to 19.2Kbit/sec under optimal line conditions, the company said. In addition, the product supports MNP and Link Access Procedure modem error-checking techniques.

The modem monitors the condition of dial-up lines and falls

back to 2,400, 1,200 or 300 bit/sec when the line degrades. The MultiModem932EC can communicate with modems that support CCITT V.22bis and V.22 standards, as well as Bell 212A and 103 standards.

The MultiModem932EC also features callback security, in which callers dial into the modem, enter a password and hang up. The modem then checks an internal list to verify the caller's access privileges and dials the user back to establish the connection.

The MultiModem932EC costs \$999 and is available now.

Multi-Tech Systems can be reached by writing to 2205 Woodale Drive, Mounds View, Minn. 55112, or by calling (612) 785-3500 or (800) 328-9717. **■**

AT&T upgrades Merlin

continued from page 27

tomized messages, such as "in a meeting" or "out all day" for internal callers who have display phones.

It also features user-programmable lists that restrict outbound calls to specific area codes and exchanges and a Page All feature that allows delivery of a message to Merlin telephones with built-in speakers. For example, a user trying to reach a coworker whose line is busy could page the person over the speaker if the call is urgent. Users can page one or more recipients.

Prices for Merlin II Release 3 are between \$500 and \$900 per station; the Release 3 software upgrade package starts at \$1,200 and is scheduled to be available in the fourth quarter.

AT&T's new telephone, the

22-Button Built-In Speakerphone Telephone with LCD Display (BIS-22D), can be used with all models of Merlin as well as with the AT&T System 25 PBX.

22 options

BIS-22D's 22 buttons let the user access up to 20 outside lines as well as intercom links or any of the phone system's programmable features. Individual buttons are dedicated for messages, speakerphone, microphone and Hands Free Answer on Intercom (HFAI). In addition, the phone has five fixed buttons for conference, drop, transfer, hold and recall functions.

The HFAI feature enables the user to press the HFAI button and answer any calls by saying hello. Calling party identification tells

First Look

continued from page 27

priced at \$4,495, and an ISDN software package compatible with AT&T, Northern Telecom, Inc. and CCITT ISDN standards costs \$995. Other software packages are available. The basic Interview 7000 is priced at \$15,995; the basic Interview 7500 costs \$21,495.

Telenex Corp., AR Division, 7401 Boston Blvd., Springfield, Va. 22153; (703) 644-9255.

Integrated Network unveils All-Rate unit

Integrated Network Corp. has introduced an **All-Rate** channel service unit/data service unit that supports data speeds of 2,400, 4.8K, 9.6K, 19.2K and 56Kbit/sec, controlled through a switch on the unit's front panel.

The All-Rate unit can be used for point-to-point, multipoint and limited-distance applications. It has built-in diagnostics, including local and remote loopbacks, self-tests and bit error-rate checking. The All-Rate CSU/DSU is priced at \$650.

Integrated Network Corp., 757 Route 202/206, Bridgewater, N.J. 08807; (201) 218-1600.

New module gives analyzer BPS support

Progressive Computing, Inc. has introduced a new protocol module for its PA1 Performance Analyzer that enables the PA1 to support the Burroughs Poll Select (BPS) protocol.

The **PA1**, an add-on board for personal computers that allows them to be used as performance analyzers, was introduced earlier this year with protocol modules for Systems Network Architecture/Synchronous Data Link Control, Binary Synchronous Communications and X.25 nets.

The PA1 can measure more than 35 technical performance parameters to help troubleshoot communications bottlenecks, equipment malfunctions and inefficient network configurations.

It features a software breakout box with pulse detection and capture, an asynchronous terminal adapter with file transfer capability and a remote option for access to off-site lines via modem-to-modem connection.

The PA1 is available for \$1,995 with one protocol module included.

Additional modules can be added for \$495 each. A 15-day, free product trial is also available.

Progressive Computing, Inc., 814 Commerce Drive, Suite 101, Oak Brook, Ill. 60521; (312) 574-3399.

Pitney Bowes software locks out junk faxes

Pitney Bowes Facsimile Systems, a subsidiary of Pitney Bowes, Inc., recently introduced a junk facsimile lockout feature for its 8050 Group III fax machines. The software option limits incoming fax traffic, allowing reception of documents from up to 99 user-selected telephone numbers stored in the machine's memory. Users can override the feature by using the manual receive button to accept transmissions from other numbers.

As part of the handshake between Group III fax machines, sending units transmit their station identification, or telephone number. The lockout feature uses this identifier as an access code, and the receiving unit compares it to the numbers in its memory. If a match is found, transmission takes place.

The software is also available as a field upgrade for 8050 users.

It is priced at \$150 as an option and at \$250 as a field upgrade and is available now.

Pitney Bowes Facsimile Sys-

tems, 3191 Broadbridge Road, Stratford, Conn. 06497; (203) 381-7421.

Inexpensive pack lets Mac act as server

Information Presentation Technologies, Inc. recently announced a low-cost software package that lets Apple Computer, Inc.'s Macintosh act as a non-dedicated server for AppleShare networks while continuing to function as a user workstation.

The **Personal Server Network (PSN)** allows any Macintosh, IBM Personal Computer or Unix workstation on a LocalTalk or Ethernet network to act as a server while simultaneously running user applications.

The PSN, which complies with the AppleTalk Filing Protocol, costs \$149 per server. PSN software only resides on the workstation designated as a net server.

Information Presentation Technologies, Inc., 23801 Calabasas Road, Suite 2008, Calabasas, Calif. 91302; (818) 347-7791.

Xircom adapter links PCs directly to Ethernet

Xircom, Inc. recently announced an adapter that enables laptops and IBM Personal Computers and compatibles to connect directly to Ethernet networks. The **Xircom Pocket Ethernet Adapter** is a small device that offers a parallel port on one side and an Ethernet port on the other.

The device comes in two models. The PE10B2 adapter has a BNC interface for RG-58 coaxial cable or thin Ethernet via a T-connector. The PE10BX adapter has a 15-pin connector that supports an Attachment Unit Interface cable to fiber or twisted-pair Ethernet.

Available now, the products are priced at \$695, including driver software for Novell, Inc.'s NetWare.

Xircom Corp., 22231 Mulholland Highway, Suite 114, Woodland Hills, Calif. 91364; (818) 884-8755.

Toshiba introduces 6500 line of telephones

Toshiba America, Inc.'s **Telecommunication Systems Division (TSD)** recently introduced a line of business telephones. Four models are available in the 6500-Series, including a 10-button speakerphone, a 10-button telephone with intercom, a 20-button speakerphone with LCD and a 20-button telephone with intercom.

Pricing has not yet been set.

Toshiba America, Inc.'s Telecommunication Systems Division, 9740 Irvine Blvd., Irvine, Calif. 92718; (714) 583-3700. ■

the call recipient who is calling on the intercom, permitting the recipient to screen calls.

A 16-character LED display provides clock, calendar, alarm and timer functions.

The BIS-22D, priced at \$395, will be available in the fourth quarter.

AT&T General Business Systems can be reached by writing to 99 Jefferson Road, Parsippany, N.J. 07054, or by calling (800) 247-7000.

The company's new intelligent speakerphone modules — the S201A and S202A — are intended to improve voice transmission quality over earlier speakerphones.

AT&T's S201A module can be used with any 7400 Series digital telephone or 7500 Series ISDN terminal equipped with an adjunct speakerphone jack. The S202A can be used with the 7303,

7305 and Merlin telephones.

Self-calibrating

Unlike older speakerphones that were calibrated when manufactured, the S201A and S202A automatically recalibrate themselves every time they are plugged in to compensate for room noises. The unit automatically conducts an acoustical test, emitting short tones, listening to them and adjusting accordingly.

The speakerphones also listen for noise on the telephone line so speakers no longer have to raise their voices to be heard and calls are free of clipped syllables and lost phrases.

Both models are available now and cost \$190.

AT&T Business Communications Systems can be reached by writing to 55 Corporate Drive, Bridgewater, N.J. 08807, or by calling (800) 247-1212. **■**



At this point, it's hard to tell which end of the system is in charge.

Systems managers once held complete control over all computers. Now, PCs and workstations are everywhere, with their users howling for mainframe access.

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FAX

BY JOE MOHEN

Interface to E-mail comes up short on key features

Remember the predictions of the paperless office? Ten years ago, we could all see it coming — electronic mail, electronic data interchange — even the U.S. Postal Service was getting into the act. EDI has long since become a reality, and office workers commonly make use of E-mail. But look at your own desk right now. Has the paperless office become a reality? The answer is an unequivocal no.

Why not? In part, because the most popular form of E-mail these days is not MCI Communications Corp.'s MCI Mail, nor Western Union Corp.'s Easylink, nor CompuServe, Inc.'s CompuServe. Nor is it based on DISOSS or X.400. It's facsimile. And fax breeds paper — lots of it.

The fax industry has taken a big bite of the demand for other forms of electronic mail. Major E-mail providers have responded sensibly to this demand by allowing their subscribers to output text messages to fax machines. For example, MCI Mail allows users to send or copy messages to any Group III fax machine anywhere in the world. They simply upload the message to MCI, whose computers then autodial the telephone number of the fax machine that is specified as the recipient.

MCI Mail fax service is extremely convenient compared to other ways of faxing. Because users don't need to feed a document into a scanner, it is very fast. Moreover, users can build distribution lists that include recipients who get the message via fax, E-mail, regular U.S. mail and express courier.

However, MCI Mail's fax interface is expensive. Once a week, I use it to send a 1½-page memo to approximately 20 coworkers in 13 countries. My MCI bill to send this memo is more than \$200. This is prohibitive. Does the service really need to be this expensive?

The answer is no. It's not that MCI is overcharging. The company has to pay for the prime-time, long-distance and international calls, and even though it's also a phone company, the faxes tie up trunk lines.

But MCI Mail could still make its profit, and users could benefit from a much lower price, if MCI and its competitors offered an option to specify delivery during off-peak hours. MCI's computer could make the calls when the rates are least expensive.

In fact, the default should be off-peak, and only when users specify "priority" should it be sent during the most expensive telephone hours. With this default in place, the price customers pay would be half of what they're paying now.

Another feature MCI needs to add to its MCI Mail fax is the option to make positive acknowledgments. Currently, every time a fax successfully reaches its destination, the system generates a return electronic message back to the sender either confirming or denying delivery. Those who use large distribution lists are deluged with these acknowledgment messages every time they sign on.

It would be far more preferable if users had the option to say, "Only send me negative acknowledgments." Other E-mail fax interfaces suffer the same problems. I urge the networks to solve them now.

What's MCI's point of view on these features? An MCI spokesman says that while the company plans to make fax acknowledgments optional in the future, there are no plans for an off-peak option. There should be. ■

Mohen is a Systems Network Architecture specialist and consultant based in New York.

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EDITORIAL

Stronger action needed to spur info services market

The expiration this month of the Modified Final Judgment ban on AT&T's entry into the electronic publishing market is a positive step toward stimulating the emergence of a mass market for on-line information services in the U.S.

But it's not enough.

Seven years after the divestiture of AT&T, communications and information industry regulators still haven't figured out how to reconcile their twin, but often conflicting, goals.

First, they must prevent any single company from gaining monopoly control of both communications facilities (the conduit) and information sources (the content) in any particular geographical area.

Second, they must ensure the emergence of strong U.S. competitors in these two converging arenas so that the U.S. can regain the world trade leadership position it has lost to Japan.

Here are three specific actions that would go a long way toward reaching both goals:

- Promote the nationwide availability of at least two competing broadband network feeds to serve every home and business. These feeds could be based on various combinations of fiber-optic cable, coaxial cable and broadcast satellite technologies.
- Completely deregulate the provision of information services in areas where competing local communications facilities exist. In such areas, this would mean allowing the Bell operat-

ing companies and other local exchange carriers to enter the information services market along with AT&T and its fellow long-distance carriers.

The only regulatory restrictions that merit retention are those that prevent monopolistic cross-ownership of competing conduits or content sources in any geographic area.

■ Ignore the protests of protectionist industry lobbies such as

Seven years after the divestiture of AT&T, regulators still haven't figured out how to reconcile their twin, but often conflicting, goals.

the American Newspaper Publishers Association. That association should join forces with the Information Industry Association, the Videotex Industry Association, the Tele-Communications Association, Inc., the International Communications Association and other groups to encourage cross-industry joint ventures to develop new information services.

Then everyone can move forward to develop many types of nationwide on-line services, in-

cluding phone directories and classified advertisements.

With or without the blessing of industry associations, cross-industry consolidation will continue to blur the boundaries between the computer, communications and information industries, perhaps to such a degree that some of those associations may end up merging themselves. As an example of the interesting combinations that are being conceived, consider the attention that's being given to the potential joint marketing agreement between AT&T and Nintendo Corp. of America.

With universal availability of broadband public network facilities, new on-line entertainment services based on digital graphics and video will emerge, and new regulatory questions will crop up.

Inevitably, some people will want regulators to legislate the most basic issue of all: What should the new broadband public network be used for? In addition to providing basic communications services, should it become a universal on-line library or a universal arcade?

There's no need to argue about which is preferable. With careful, light-handed regulation of converging industries, we can enjoy both those options and more.

It's time for everyone to spend less time arguing about what services should be allowed and more time on making new services available. ■

OPINIONS

CORPORATE POLITICS

BY BARRY TANNER

A good offense is your best defense

You've been researching voice mail for some time, but your old private branch exchange is an obstacle. Without a six-figure investment in software, voice mail won't work; it's technically and fiscally unwise. However, your retail department staffers want voice mail, and they won't take no for an answer.

Eventually, your retail department discovers a company that claims it will overcome any voice mail obstacle.

You're asked to review their pitch and find you can't recommend them because their design won't permit rotary phone users to leave messages. In addition, the system's software options are woefully inadequate (if they work at all).

This company, you argue, can't sustain its promises.

Despite your objections, the senior retail vice-president signs a standard boilerplate contract. The system is installed in two months. It never works properly and 15 months later, the manufacturer goes out of business.

Although a lot of change has affected America's telecommunications departments over the past decade, the one constant is politics.

Whether it is ego or idiosyncrasy, the "old-boy network" or country club camaraderie, interlocking directorate or investment reality, corporate politics is a fact of life. If you don't want to be caught with your pants down, respect these realities. Identify them, know them, deal with them.

Political pulse

The meeting with the building facilities department is almost over. It has been cordial and full of anticipation. Everyone agrees that it's a major task (building a 20-story office complex usually is). But something bothers you: Why didn't anyone contact you before these plans were drawn up?

The blueprints are brought out for review. Your eyes scan the prints for the usual concerns — sufficient space, access points, equipment room locations and so forth.

Tanner is a consultant with Electronic Systems Associates, a telecommunications consulting firm in New York.

You realize that the architect has not made allowances for the company's cabling plans, conduit size, riser space or cabling topology.

The current plans won't work; they'll have to be redone. You think, "Why didn't they just ask beforehand?" Once again, politics has struck.

Politics influences all decision-making. It can't be ignored, and doing so is foolish and perilous.

Have you ever taken your company's political pulse? Do you know who the real players are? Are they risk takers? Are

"Do what the Indians do," advises Saporta. **"Walk a mile in your company's shoes."**

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they comfortable with the status quo? More importantly, have you developed a relationship with them?

Teed off

You're part of a team researching the PBX needs of your company's branch offices. Your colleagues and a "competing," outside consulting firm have spent several months evaluating the options. Both teams reach similar conclusions. Recommendations are issued, and plans are made to accommodate the upgrade. Contracts are negotiated.

However, at this very moment, your company's president is teeing off with the president of a major PBX manufacturer. Before the ninth hole, your president decides to reject both teams' recommendations. By the 18th, an agreement is hammered out under which the PBX company will supply switches throughout your branch network.

Why? The PBX vendor is a major client of your company, a Wall Street investment banking firm. Forget about technical requirements, cabling and compatibility. But don't forget about political reality; it's part of the plan.

Barry Kaye, the sales repre-

sentative who lost that PBX deal on the 18th green, says it's wise to investigate your company's previous business relationships with vendors.

"If your firm's bottom line is significantly influenced by a vendor, knowing that relationship could prevent embarrassment," he notes.

What to do

Want to influence the plan? Develop insight and credibility. And recognize that quite possibly no matter what you do, it might be, as Bill Murray said in the film "Meatballs," that "it just doesn't matter."

Identify a small but nagging problem and fix it. You will have identified yourself as someone who gets things done and, more importantly, knows what you are doing. Your voice will be heard and ideas respected.

Susan Chew, manager of telecommunications for an East Coast bank, says, "Our previous manager spent time researching alternatives to the way we received stock market quotations. He came up with a solution that was more efficient and saved thousands [of dollars]. Those efforts made his future contributions that much more credible."

"Do what the Indians do," advises Jay Saporta, network manager for a large financial services firm. "Walk a mile in your company's shoes."

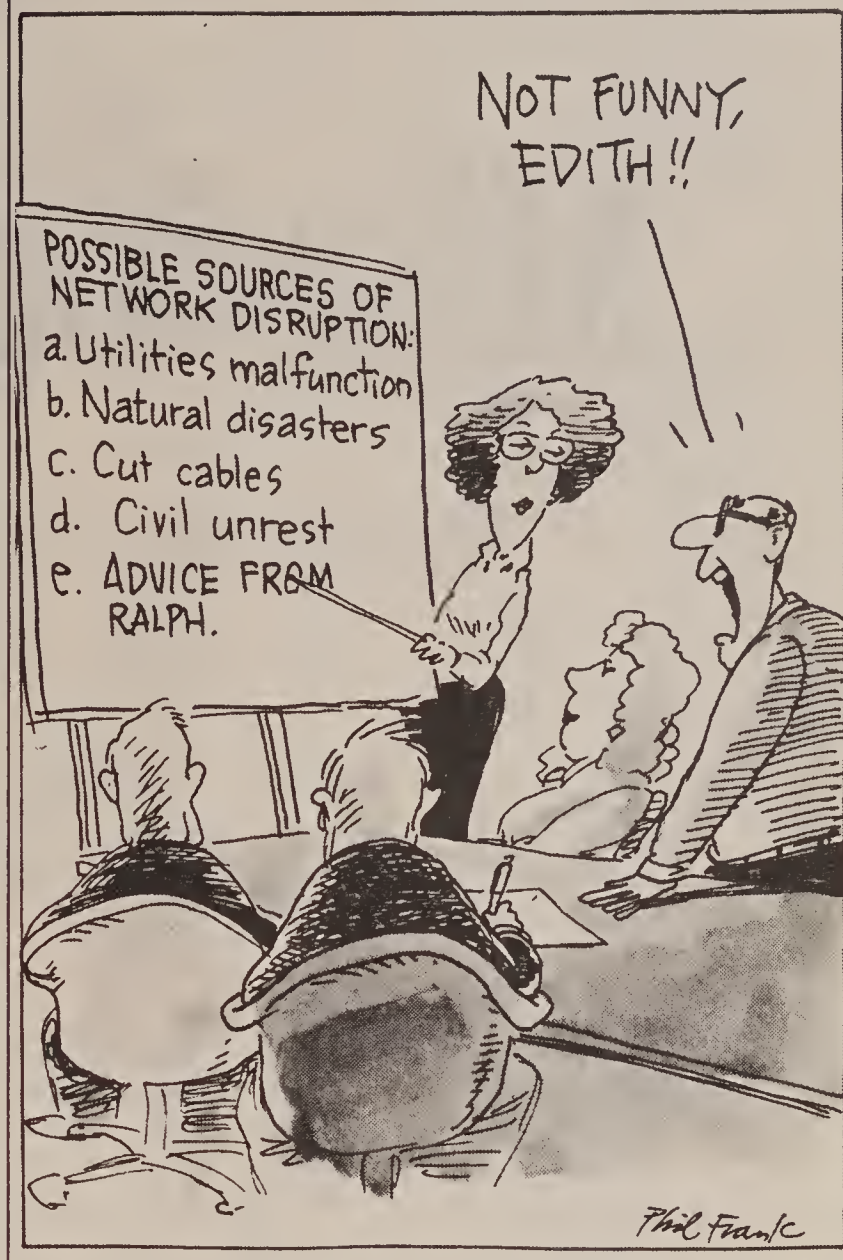
Sit in a telemarketer's chair; discover the difficulties she has handling calls at peak times. Sit in the salesman's chair; discover the labyrinth he must negotiate to process a sale. Call your main number; how long does it take to get to the correct party? How can you improve this operation? What is missing? What do the end users want to improve?

Develop contacts. If you come across an article that hits home, send it to the appropriate person. Create interest; stay a step ahead. Motivate your superiors and subordinates; practice good public relations.

You have a responsibility. Politics is about taking charge. Where were you when a project was initiated? If the proverbial mountain won't come to you, go to it. Keep informed, take your company's pulse, listen to the grapevine, discover what's going on. And if you don't have the skills to do it, enlist your subordinates. ■

TELETOONS

BY FRANK AND TROISE



LETTERS

The double standard

The article "US Sprint says AT&T illegally lured user" (NW, July 31) is yet another example of double standards and the need for further deregulation in the long-distance arena.

I have recently experienced a similar situation while evaluating proposals for the aggregation of this company's long-distance services. (We currently use US Sprint as our primary carrier and AT&T as our secondary carrier.)

AT&T's proposal, under its promotional tariff, offered the use of a D4 channel bank and channel service unit (CSU) at one of our locations free of

charge for as long as we subscribed to its service.

We were *not* to purchase nor lease the equipment, simply use it at no cost. Once the Federal Communications Commission ruled the tariff was unlawful, AT&T had to resubmit its proposal. Meanwhile, US Sprint's proposal included, (continued on page 55)

Network World welcomes letters from its readers.

Letters should be typed, double-spaced and sent to Editor, Network World, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701.

Letters may be edited for space and clarity.

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Mission OSI

Hewlett-Packard begins
the rough trek to
open systems and
multivendor connectivity.

CONTINUED FROM PAGE 1

tems to the evolving standards of OSI-, Unix- and reduced instruction set computing (RISC)-based systems had already begun.

But embarking on such a pilgrimage entails risks. HP could lose a large part of its established customer base as it leads its followers — and seeks converts — along the path of new and changing technologies.

A road untraveled

Most observers considered HP's move to open systems a logical path for the company. HP's proprietary systems, while technically well-regarded, could not hope to compete alone with those of IBM, AT&T and Digital Equipment Corp. However, the move occasioned questions regarding HP's actual connectivity strategy.

"I classify HP as good, solid engineers of point products," says Steven Wendler, an analyst with Gartner Group, Inc., a consultancy based in Stamford, Conn. "What they traditionally lack is good, strategic thinking and good marketing."

"You've got to have somebody coordinating all your strategy, and they haven't," states an East Coast analyst for HP who requested anonymity. "[HP] isn't going anywhere because they don't have a strategy."

HP management agrees on the point-product image but disagrees about strategy.

"I think we still carry that image," says Ed Muns, general manager of HP's Information Networks Division. "In reality, the situation is very different."

"We completely rewrote all of our networking code to the OSI model back in the

late 1970s and early '80s — not to the OSI protocols but to the model," Muns explains. "We put all of our proprietary protocols and TCP/IP and [Advanced Research Projects Agency]/Berkeley into the architecture. And now we're coming out with products where the actual protocols are OSI protocols. We're not bridging to OSI; OSI is our fundamental architecture."

According to Wendler, "HP is really in a state of transition. They're coming from a history of having distinct developments — distinct products that haven't tied together all that well in the past. They're trying to move to a uniform networking strategy from top to bottom, from PCs to the 9000 minicomputer series and sideways as well, meaning MPE, HP/UX, DOS, OS/2."

Wanted: map and navigator

But it's one thing to announce a destination and another to find the right road to get there. HP's almost-completed systems migration map is known as the Cooperative Computing Environment (CCE).

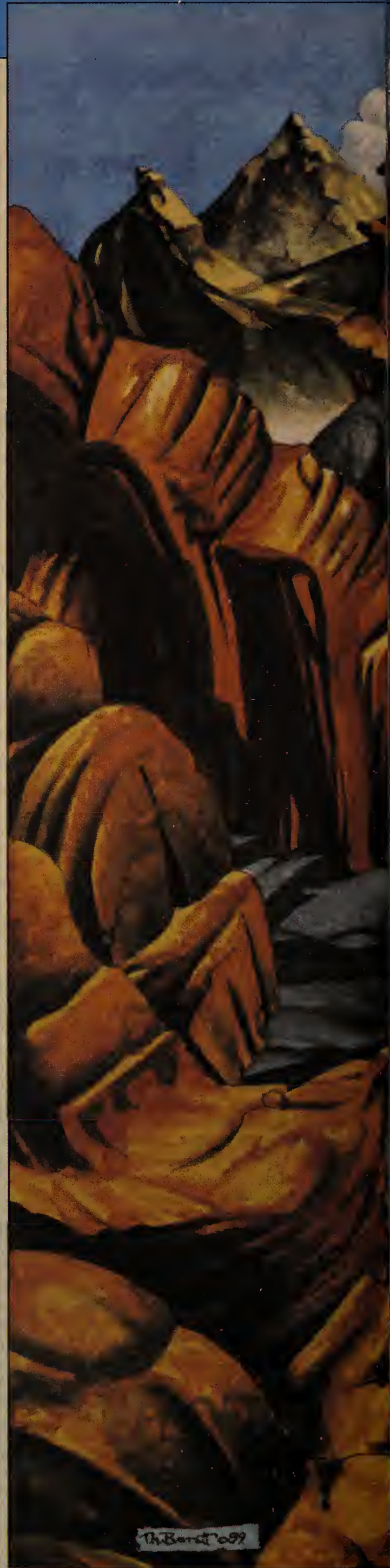
"[CCE is] based on standards," Wendler says. "With CCE, [HP is] trying to provide integrated, network-oriented services to multiple desktops from multiple servers." With CCE, these multiple servers will run under HP's MPE and HP/UX and IBM's OS/2 operating systems. The multiple desktop computers will run either DOS, OS/2, Unix or HP/UX.

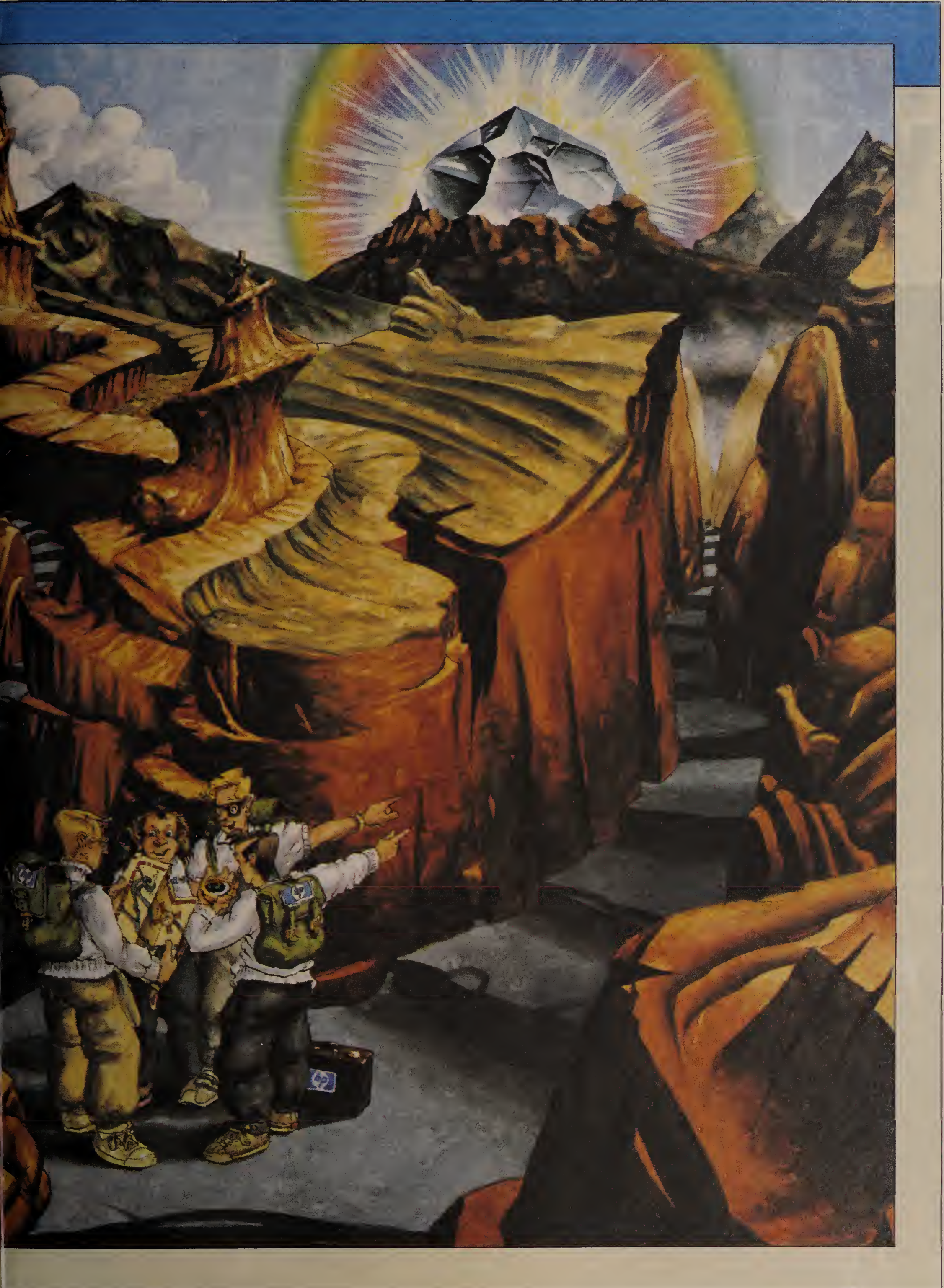
"We believe [CCE] is the reality of the industry," Muns says. "That is our overall umbrella strategy. Within that are our networking support strategies, application support strategies and so on."

With the overall systems plan nearing completion, Frank Dzubeck, president of

(continued on page 36)

Guptill is features writer for Network World.





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(continued from page 32)

Communications Network Architects, Inc., a consulting firm in Washington, D.C., thinks HP needs to address four specific areas in its migration to OSI.

"The first is HP's established proprietary networking scheme," he explains. "The company has to offer support for the existing base — some degree of enhancement — even as it's going away. HP must have a migration strategy in place.

"The second part is IBM's Systems Network Architecture. HP absolutely, unequivocally intends to be one-for-one SNA-compatible.

"The third is TCP/IP; HP refers to it as ARPA. That's the base that got HP into OSI," he continues. "The final migration is to actual OSI.

"Their goal is to eventually have two

parts: SNA, which is not going to go away for decades, and OSI, which should take care of everything else," Dzubeck says.

"Fundamentally, it's a standards-based

with a real pragmatic approach that says there's some interim, de facto stuff out there, like TCP/IP, that provides good multivendor solutions today. So let's im-

To exist in today's global environment, you cannot be a myopically structured operation," Dzubeck says.

▲ ▲ ▲

strategy with two long-term fundamental standards to support: OSI and SNA," confirms Robert Emerson, HP's marketing manager for enterprise networks, "but

plement them today and provide migration to OSI as that rolls out."

To satisfy the need for a navigator to oversee progress and chart the best

course, HP hired Joel Birnbaum as chief architect of its systems in 1988. Formerly of IBM, Birnbaum is "one guy who's going to be sure that all of the various pieces of the computer groups will work together as a unified whole," according to Wendler. He sees Birnbaum's position as adding great value to HP.

Birnbaum's real effect on the company won't be felt for at least a couple of years; for example, he would have been unable to affect the 1988 development plan.

However, Wendler and others say that having a strategy and navigator in place has already helped HP improve its financial performance.

Since 1985, HP's annual revenue has consistently increased, while chief rival DEC's revenues dropped between 1987 and 1988. Wendler sees HP's increases as a direct consequence of the organizational changes (see graphic, page 40).

Part of the reason for the turnaround is HP's growing presence overseas. In 1988, more than half of the company's revenues came from overseas operations.

"Theirs is a global viewpoint," Dzubeck says. "They do not see themselves as just an American company. The majority of their revenues comes from overseas — 56% last year. To exist in today's global environment, you cannot be a myopically structured operation."

Reading the map

Five divisions, called Solutions areas, direct HP's day-to-day connectivity strategy:

■ Manufacturing, with an emphasis on 802.4 and Manufacturing Automation Protocol products.

“Theirs is a global viewpoint.”

▲ ▲ ▲

- Engineering, including networked workstations and Unix.
- Business Office, including office automation products.
- Regional Sales and Service, which includes networking support services.
- Enterprise solutions, which "pretty much ties everything together," according to Emerson.

Managers from each division meet at least once a month to review cross-solution issues, one another's strategies and major market trends. "There's heavy interaction among the groups," Emerson says.

Emerson views HP customers as extremely sophisticated users. "The kinds of customers we're really focused on are thinking networked systems and networked applications. They're not viewing the network simply as a connectivity vehicle."

To address these users, HP has developed a six-part enterprise networking infrastructure:

- The transmission network (usually X.25).
- Transport medium.
- Access methods.
- Network services.
- Network management (encompassing the above four).
- Network support and service.

(continued on page 40)

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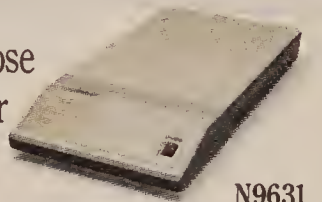
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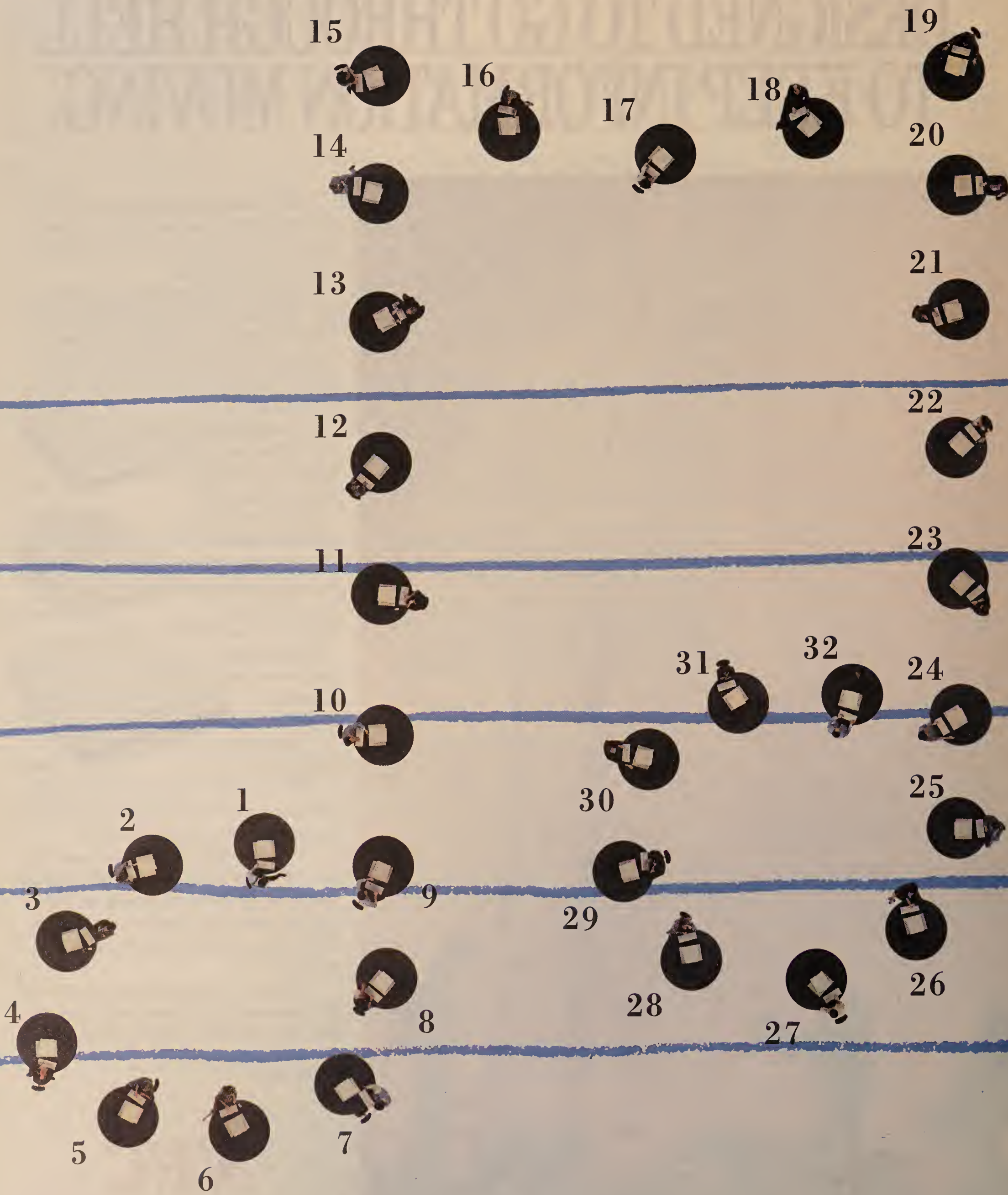
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The IBM logo, consisting of the letters 'IBM' in a stylized, striped font. The letters are composed of horizontal bars of varying lengths, creating a three-dimensional effect. A small registered trademark symbol (®) is located at the bottom right of the logo.

(continued from page 36)

An example of an HP wide-area, or enterprise, network is the X.25 network of car rental company Hertz Europe, which was developed, installed and managed by HP. The network uses HP's Private Packet Network (PPN) X.25 packet switches and packet assembler/disassemblers, and third-party T-1 multiplexers. Hertz Europe owns the network but has delegated the daily management operation of it to HP. HP maintains global network support centers in Atlanta, Singapore and Bristol, England, and manages the Hertz Europe network from Bristol.

Network management

PPN products include an extensive network management system that offers remote diagnostics and fault isolation. The PPN network management system encompasses all the PPN switches and PADs, and has a general-purpose tool kit that allows users to develop customized screens on the network management system for accessing other vendors' equipment.

The company is developing a user interface that would allow PPN access through OpenView, HP's integrated network management product. Therefore, network management information would be available to users on a microcomputer, but the actual network management functionality would remain on an HP 9000 minicomputer.

"I don't think we will be able to migrate this to something smaller than the 9000," Emerson says. "This system, which is fairly typical for packet networks, is an active element of the network. There's a definite need for multitasking and a definite need for a significant amount of horsepower."

Emerson says he believes that

its capabilities.

"[OpenView] doesn't have the architectural vision of SNA Management Services, for example," says Gartner Group's Wendler. "Strength of architecture is greater in SNA Management Services, DEC's Enterprise Management Architecture and AT&T's Unified Network Management Architecture (UNMA)."

"In terms of network management products, I would rate AT&T — because of UNMA and its physical capabilities — in combination with the Cincom [Net/Master] product, tops in the marketplace," he continues.

"Second would be IBM's NetView. Third would be OpenView because they've got somewhat of a product; fourth would be DEC because they don't have a product yet."

"OpenView is a good idea and good strategy, but I think they chose the wrong platform," adds James Herman, principal with Northeast Consulting Resources, Inc., a consulting firm in Cambridge, Mass. "Fitting into the Unix workstation environment is going to be key for HP. If they had started out there, I think they would be much more influential than they are now."

HP doesn't disagree with those assessments and is, in fact, doing something about them. OpenView staffers are working to develop OS/2 and Unix versions of the product.

"We're pursuing a two-pronged approach," says David Mahler, OpenView product marketing manager. "We're primarily developing the Unix version internally and are working on OS/2 development in partnership with 3Com [Corp.] We were able to pick up a lot of Unix development from Apollo."

HP also recently shifted its OpenView emphasis to recognize the importance of TCP/IP net-



works, there has been relative silence surrounding OpenView, especially when compared with the ballyhoo from IBM and AT&T about their own products.

A reason for this is HP's plan for including other vendors' products.

Rather than developing and then touting interfaces for third parties, HP has chosen to let outside developers do most of the work in that area. The company offers an OpenView developer's kit to third parties, including users, who are interested in interfacing their networks or network products with OpenView.

HP is also using the kits to develop OpenView interfaces for its own products. In time, Mahler says, all HP networking products — including those of recently acquired Apollo and Eon Systems, Inc. — will work under OpenView.

"I think the development kits are necessary," says Steven Spanier, a vice-president with Infonetics, Inc., a Santa Clara, Calif.-based network testing and analysis firm. "All that any company can do is support its own products effectively within a comprehensive network management strategy. HP is doing that with its own products using OpenView."

"However, there's a lot of equipment out there that they can't do much about yet," Spanier adds. "HP's got a hellacious number of products; they need some help to cover some of the more esoteric third-party systems. All the companies will be doing this sort of thing."

Mahler adds that OpenView will include HP's network testing products.

"It's been a longtime desire of ours to better link the instrument and computer activities," he states, "and network management is the realm where that happens."

This will be an advantage, according to Herman. "Hewlett-Packard is very strong in measurement and testing," he explains. "They have it over everyone because they're the ones who plug in at the physical level and actually measure the equipment. If they can put that together with the right application platform for analyzing the data, they [would] have a very powerful

combination in the future."

Anyone want some?

While OpenView development continues apace, the question of market acceptance grows more important: Will users buy it and justify the time and money spent?

According to conventional wisdom, users just aren't ready for integrated network management systems. To date, very few users are buying into the integrat-

canned solution. I don't think canned solutions will be available for many years."

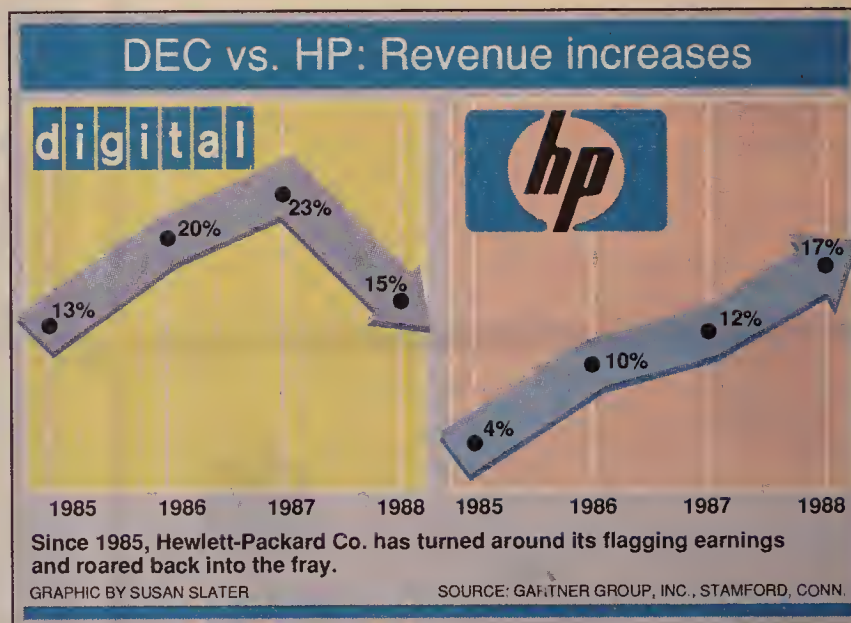
Thanks for your support

Service and support, a major part of overall network management, is evolving into a key line of business for HP. It also plays a major role in company alliances and acquisitions.

Networking support was a big part of the HP purchase of 3Com stock in February. In addition to porting 3Com's 3+Open networking software to Unix, HP also pledged global service and support for 3Com and Bridge Communications products, offering users support for 3Com, Bridge and HP products under a single service contract.

In the same week, Novell, Inc. of Provo, Utah, also announced support and service arrangements with HP.

Douglas Greenwald, computer network analyst for the University of Akron in Ohio, lists HP support as a major reason for the school's purchase of HP networks and systems.



ed management dream.

"There's a good reason for that," says Infonetics' Spanier. "Integrated net management, at this point, is not products but strategies. As such, they have little embodiment in reality."

"Until you get the holistic strategies embodied in products," he adds, "you won't see people buying them."

"There's not enough to buy," Herman says. "I think that users who care about network management are still mostly rolling their own. We're not going to see a market develop for a couple of years; 1991 is when we will start to see [integrated net management systems] become real. Vendors understand [integrated network management systems] as a technical matter and are hammering out the details to make them work."

Again, HP management does not directly disagree.

"In general, integrated network management solutions are still pioneering overall," Mahler says. "The cost of implementation is still high; there is still a need to customize a number of the solutions, and the introduction rate is slower than for a

"Their support was important," Greenwald affirms. "It was part of the purchase contract."

Enterprising alliances

The strategy of third-party support is an extension of HP's position on the need for third-party involvement in product development.

"Working with other vendors is absolutely necessary in the networking business," says HP's Emerson.

"About five years ago, we made the transition from thinking about wholly in-house development to realizing we really have to use outside suppliers if we're going to succeed in the computer business," HP's Muns adds.

The 3Com alliance is an example of this. In addition to the previously mentioned networking service and support, the deal included a swap of 3Com's LAN Manager-based 3+Open network software for HP's porting of 3+Open to Unix. 3+Open should thus be able to talk to HP's Unix version of LAN Manager, LAN Manager/X.

In addition, the two compa-

(continued on page 55)



superworkstations operating under HP/UX may someday be able to manage large enterprisewide packet networks. HP's acquisition of Apollo Computer, Inc. is one step in this direction; another, at least as important, is the continuing development of OpenView.

Currently, OpenView is dependent on MS-DOS and PC-DOS platforms. As such, it is limited in

work management as a stepping-stone to OSI.

"The slow pace of OSI development has affected OpenView development and user demand for network management protocols," Mahler says. "We've rethought and repositioned our OpenView strategy to give increased visibility to TCP/IP management."

As with many other HP prod-

HP's network technology broker

Network World
interviews
Dan Warmenhoven,
general manager of HP's
Information Networks Group.

The ink on Dan Warmenhoven's electrical engineering degree from Princeton was barely dry in 1972 when he took a job at IBM's Yorktown Heights, N.Y.-based Advanced Systems Development Division, where he worked on product development for communications controllers.

Shortly thereafter, Warmenhoven moved to IBM's Systems Development Division in Poughkeepsie, N.Y., and worked on IBM distributed systems, including the Series/1, 3790 and 8100. In 1977, he moved to Raleigh, N.C., the center of IBM's communications system development efforts, where he managed the 3708/3710 program. He then managed IBM's Token-Ring Network program for three years.

Warmenhoven joined Hewlett-Packard Co. in January 1985 as a research and development lab manager, then became general manager of the Information Networks Division in August 1985. In February 1988, he became general manager of HP's Information Networks Group.

Warmenhoven clearly relishes his role as a technological matchmaker charged with bringing together a myriad of computer and communications systems. He recently discussed HP's current stance in the networking market with *Network World* Features Editor Steve Moore.

What is HP doing to resolve the differences between its HP/UX operating system and the Domain operating system from HP's newly acquired Apollo Division?

The first step is full interoperability. Second, there are issues of marrying the HP precision architecture family with Apollo's Prism architecture. Our focus for operating system convergence is the Open Software Foundation. Interoperability first, then platform convergence to some degree, and third, the operating system convergence focus.

The Domain system has three personalities — Berkeley Unix 4.2, AT&T Unix 5.3 and Apollo's Aegis, which is the only one that we don't already support on HP/UX.

Is it correct to say that Apollo's approach was to distribute the operating system itself so that some of the information that goes across the network is at the level of commands that flow between different segments of the operating system?

Yes. That's not at all inconsistent with our strategy. We had a technology called Distributed Unix that we refined in the HP labs in 1984. We never publicized it widely, but we use it to provide support for diskless workstations, and it's been implemented and distributed.

We were strongly attracted to Apollo's Network Computing System [NCS] even before there was any kind of discussion of a business merger, to the point where we signed an NCS license agreement almost a year ago. There are certain differences in implementation philosophy but great similarity in terms of concepts and architectural structure.

Now that HP has acquired Apollo, how long will it be before new NCS applications become available to users?

I think you'll see them emerging before this year is over. But I'm not sure they'll be supported across all of our systems by that time. Most of the applications that Apollo uses NCS for are system management appli-

(continued on page 42)

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(continued from page 41)

cations, which is the first thing that everyone always focuses on. They're not end-user applications, but they set the foundation for a lot of other things. I suspect you'll see our system management applications expand dramatically this year.

Where are cooperative processing and distributed computing headed?

Our view is that the computing assets in most enterprises are not well-utilized. And that is because there hasn't been any easy-to-use method for distributing applications, segmenting them into pieces that are suited for particular types of systems and then knitting them together so that systems can provide services for which they are maximally tuned.

As a result of not being able to partition

applications, you find that they are still rather monolithic. That leads to a certain degree of inefficiency and underutilization of the computer. The bulk of today's on-line transaction processing systems use this monolithic approach.

A different approach is to put an intelligent forms manager outboard that manages all the interactive things — the session overhead, the edits and so on — and leads the user through the transaction and then sends the transaction back to wherever the data base is. This would be a more cost-effective solution than what you find today because today the PCs are underutilized, and the multiuser or multisession systems are doing inappropriate tasks.

What new standards will be needed to allow this to happen?

We need open distributed processing standards. There's a reference model being developed for what goes on top of a network to support distributed computing. I think that's a long way off. We're a decade or so away from having a formal standard that the CCITT would put its blessing on. The discussion now centers around what the reference model should be, which is where OSI was 10 years ago.

Beyond open distributed processing, net management standards and distributed SQL standards have to come to closure and are being widely implemented. In terms of knitting together the applications, the other thing that's needed is standards for object models and shared objects, which is the goal of the Object Management Group.

What is HP's approach to network-

ing image processing applications?

Bandwidth technologies are going to take an order-of-magnitude leap. T-1 and fractionalized T-3 are making bandwidth available in the wide area, and the growing availability of 802.6 and [Fiber Distributed Data Interface] implementations will cause an order-of-magnitude leap in the office.

But the link technology is not the big issue. There will be all kinds of solutions there, some in the gigabit range. The issue is going to be the software technologies and how you get more throughput through a traditional OSI stack or TCP/IP stack.

We've had a number of experiments going on in our lab dealing with low-latency networks and high-throughput nets. In a low-latency network, the delay between the time you send a packet and the time it's received at the other end is minimized.

That doesn't necessarily deal with volume of traffic; that's the focus of the high-throughput activities. The goal is to maximize the volume of data that can be transferred between two nodes. This can be achieved in a high-latency environment, such as a circuit switch; it takes a long time to set it up, but then you just blow it through.

The other issue is, if I want to have real distributed computing, I have to be able to synchronize tasks and share memory, and those are low-latency requirements. They involve small amounts of data that have to be there on demand or everything bogs

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“In terms of knitting together the applications, the other thing that's needed is standards for object models and shared objects.”

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down. We've got a number of software and I/O approaches to both.

Have any of those approaches appeared in current HP products?

The Van Jacobsen technique provides a fast path method for moving quickly through a traditional TCP/IP stack. We've refined that and used it in our TCP implementations on Unix, which are now in the beta stage, and we're going to roll that out in the rest of the implementations we have as well.

Most networks today don't have any heuristic characteristics at all; that is, when a packet is received at a particular system, that system doesn't make any assumptions about where the packet came from.

The Van Jacobsen technique is very simple: It assumes that the next packet you get came from the same node that sent you the last one. And you check to see whether that's the case, and if it is, you bypass all the protocol stack and go right to the application.

And it turns out that the assumption is true in most application environments. You have to figure out how you implement that in terms of data structures and all the rest, but you can bypass all kinds of

processing overhead, both inbound and outbound.

What is HP doing with FDDI?

I'm not convinced that FDDI is the right answer, but we will be providing FDDI products because I'm convinced the market will demand them. FDDI is too little too late.

If you look at where 802.6 is going, it seems to solve the problem of the site backbone. It could be the 100M-bit class network that provides the site backbone facility, which is one of the applications with FDDI, and then you can have the same site backbone as you have wide-area backbone. That has great appeal from my viewpoint; it's not quite here yet, but I think it's going to be the preferred solution.

And when you look at local work group distribution, why should I stop at 100M bits? If the technology for gigabit class is right around the corner and gigabit has been reasonably well-developed, why not go with that?

So FDDI looks like an interim solution until the others solidify in a few years. However, they can all use the same fiber.

How much bandwidth will be needed to support quick transmission of animated digital graphics files that have high resolution and a lot of pixel depth?

That question implies that there is some limit, and I don't think there is. As far as I can see, with both the rate of computation capacity in [millions of instructions per second] and the acceptance of cooperative computing increasing dramatically, the demand for bandwidth is going to continue to grow.

Certainly, we'll go through the 100M step, and we'll do FDDI. We already support FDDI backbones, and we're certainly interested in FDDI native attachments for our systems to plug right into an FDDI ring. I just don't see that as a long-lasting phenomenon in the market.

The interesting thing is that there are two reasons for FDDI in the work group. One is the aggregate volume of traffic, and the other is the volume of traffic per workstation — the issue of the large image. I think customers who are selecting FDDI today to solve the bulk data transfer problem are going to be disappointed. The FDDI solutions today help with solving the aggregate volume of traffic in a work group but not the point-to-point burst issue.

I haven't benchmarked every vendor's system, but I suspect that most implementations will look like our initial one did, in which the throughput you got on an application-to-application basis wasn't a whole lot better than what you get on an unloaded Ethernet because the bottleneck was not the link. The bottleneck was the software structure.

What impact will multimedia systems have on HP's approach to networking?

I really am a believer in fast packet technology. I'm convinced that's going to be the right solution to mixing everything together, but I think I'm probably in the minority on that one.

What is HP doing with fast packet technology today?

It's mostly experimental. We don't have a product in fast packet right now. Fast packet technology has been around for a long time, so the question now is how the implementations will emerge. I'm con-

vinced that it's the only reasonable method for mixing the multimedia. Channelization of bandwidth seems like a highly inefficient method.

product family, and there will be other implementations. At this point, we don't have an X.500 server on the market, but we're working on one.

“At this point, we don't have an X.500 server on the market, but we're working on one.”

▲▲▲

What products, if any, does HP currently have available that support X.500?

There is an X.500 user agent in the MAP

How important is Integrated Services Digital Network to HP?

ISDN is going to be a generally available link service that will provide additional ca-

pabilities beyond what's there today — especially in Europe — such as switched 64K service. That's all great, and we're going to support it, but it doesn't really solve the bandwidth issues.

We're going to support all the ISDN interfaces, and we're going to have an ISDN link setup on all our systems as appropriate. In fact, we have ISDN products that are deployed in Europe already.

How does HP view broadband ISDN?

Broadband ISDN is a little different; it will play a major role. Broadband ISDN with the fast packet technology flowing through it — now we've got something. But that's years off.

The other ISDN issue is, what level of
(continued on page 54)



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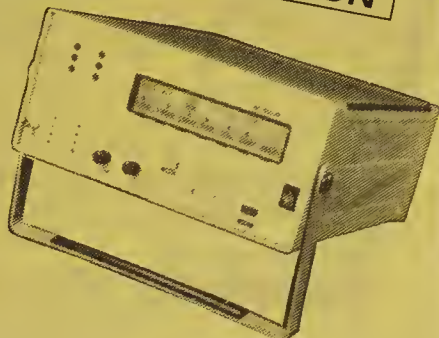
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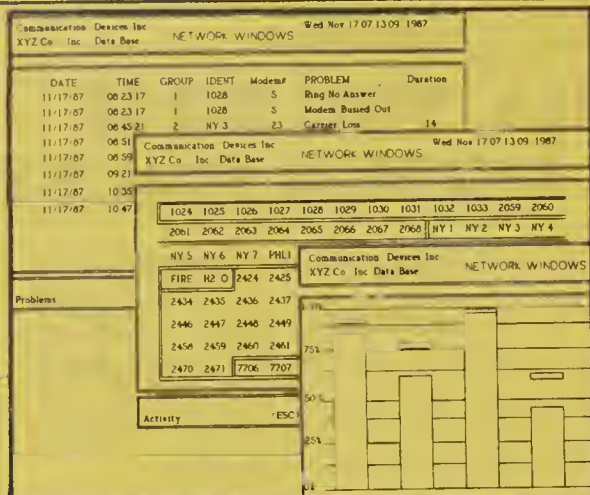
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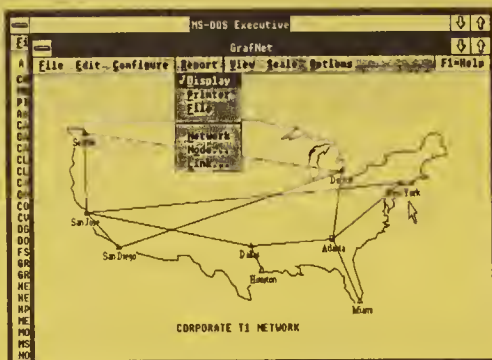
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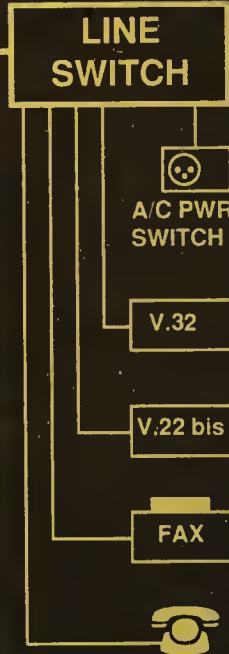
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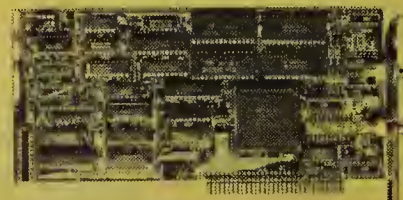
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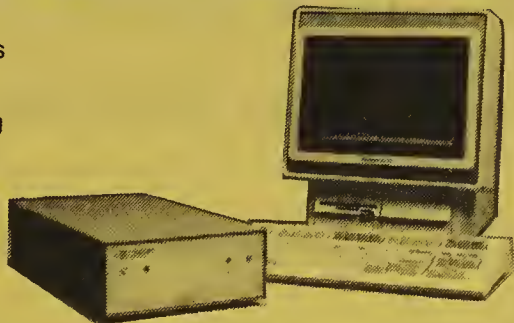
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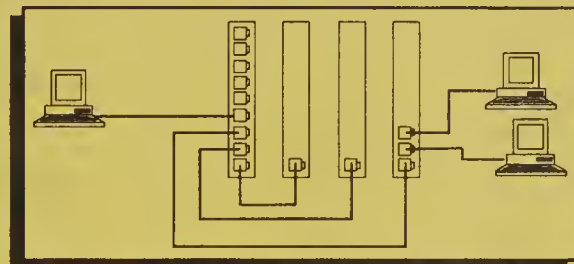
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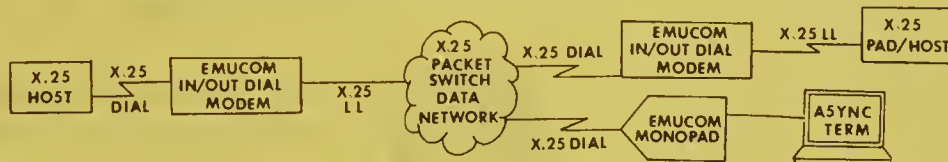
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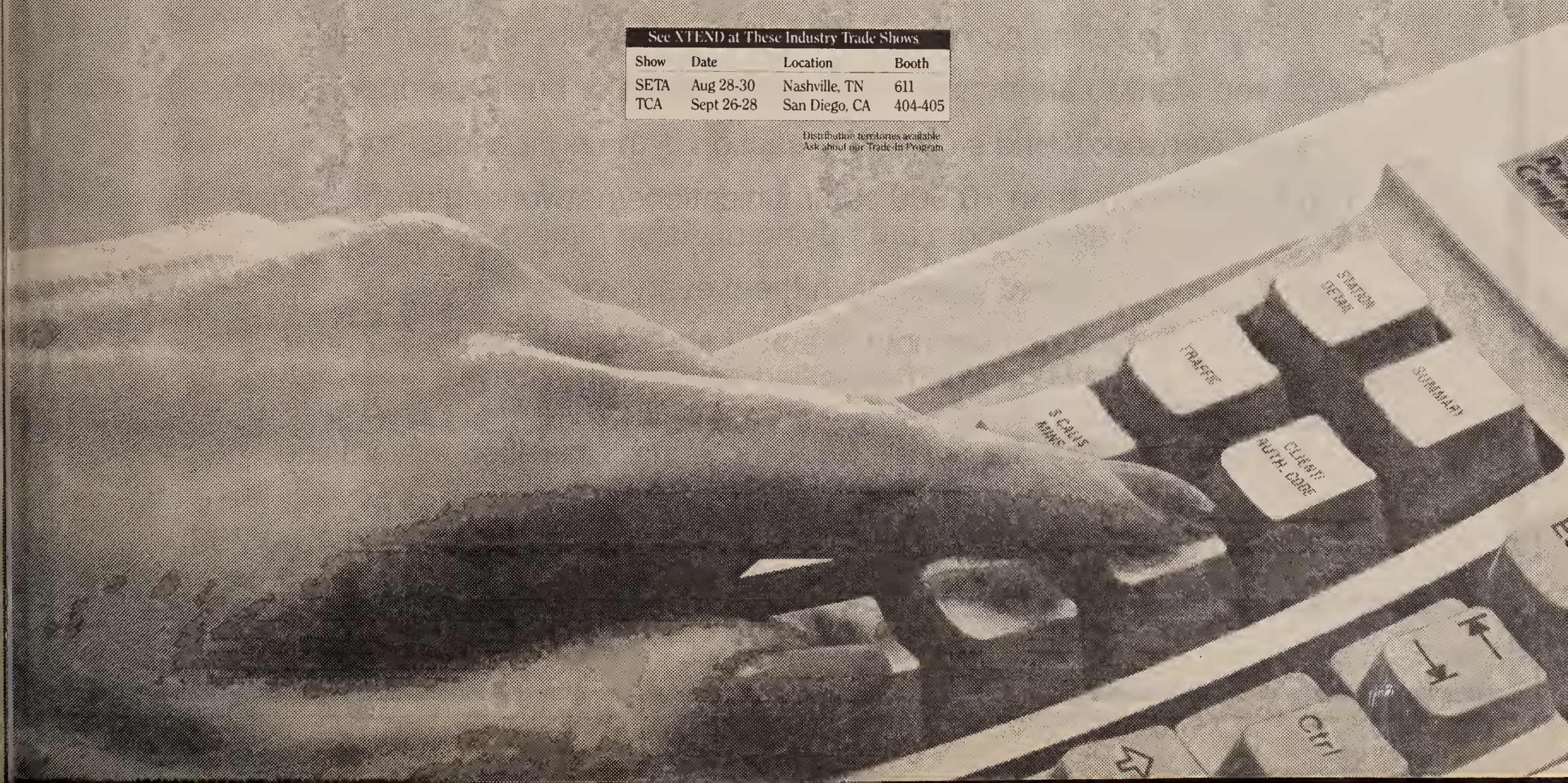
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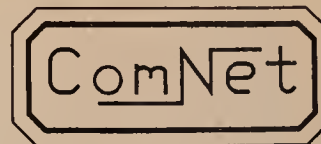
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NETWORK WORLD

An IDG Publication

(continued from page 43)

ISDN support are we talking about? Does it go up to the Q.931 level? ISDN is a multilayer protocol but not all the layers are defined yet. Q.931 today is not exciting; it allows you to make and break connections and those kinds of things, but it's not a sophisticated technique.

The market is going to demand ISDN. But not until broadband ISDN arrives do I see it really providing significant value above other solutions.

How will HP compete with DEC's Computer Integrated Telephony (CIT) and other vendors' voice/data integration technologies?

There are a number of HP voice/data integration activities under way today. We're working on a program that is CIT-like. It's a series of computer switch command structures and status structures that allow computing systems to control telephony functions. But we've focused it on various application classes, for instance, telemarketing.

Are OpenView products for the HP environment shipping now?

Functional Areas] or the [Common Management Information Service], but not all of that package is there yet.

What's available to users now?

We've already got a number of object-specific managers on OpenView, like bridge managers, and we recently introduced a distributed terminal controller manager. We have a manager for some of our instrument families. For instance, the [In-service Transmission Impairment Management Set] has a manager that runs on OpenView.

Then there are three or four other applications that are implemented on OpenView as object managers for TCP/IP networks; there is a performance monitor and three others. We think of the TCP network as one object, so there is an object manager for the TCP/IP transport.

We're also working on a remote system manager for the HP 3000. A network of 3000s would be another object, and the remote system manager function that goes with it is on the OpenView platform, so you can have a centralized operator function.

ing the two applications. LAN Manager is embedded functionality in the OS/2 systems that allows them to cooperate, so you'd have OpenView as the manager center and LAN Manager as an application element.

How many OpenView users are there today?

Virtually every 3000 customer is going to be an OpenView user in another few months because we're using OpenView to manage the distributed terminal controller that provides the terminal connectivity for the 3000 systems. Over time, our customers will move all their system management functions to a PC. The remote system manager I was referring to is on that same platform. The remote system manager can be thought of as a remote version of a LAN-attached system manager function.

In 1987, HP said it would have an 802.3-to-802.5 bridge. Is that available now?

Yes. It became available in April. To my knowledge, it's the only 802.3-to-802.5 bridge that provides interoperability, in conjunction with other bridges, via the Spanning Tree Protocol.

How did HP solve its 802.3 vs. Ethernet problem?

That was part of our coming of age in understanding standards. The mistake we made was implementing 802.3 exclusively, that is, not allowing it to operate as an Ethernet. We only made that mistake on our [Multi Programming Executive] commercial systems. The Unix systems always swung both ways and had no difficulty in talking either 802.3 or Ethernet. We've since corrected that on the 3000s.

I think certain customers would probably say we still have an Ethernet issue to deal with. That springs from the notion that Ethernet, while it's really a link, implies in a lot of people's minds all the rest of the things that go

message mode and stream mode. And two different implementations of TCP could choose to implement the same service using different modes, and they could be totally incompatible. So to get complete multivendor coverage, you may have to implement a service in both streams and message

processors plug in.

What new networking capabilities are users asking for today?

They don't ask for network capabilities — they ask for application capabilities. But that gets you into network-based solu-

“The more you make the net disappear from the end user's viewpoint, the more complicated you make it from the system administrator's or net operator's.”

▲▲▲

mode to get connectivity across. Our TCP/IP supports both, but we don't necessarily support all services over both.

What new communication functions are being built into HP computers?

The 3000/XL structure doesn't have any attached devices on the front end; it's got a LAN interface, and that's it. The one device that was directly attached was a console, and we are taking that off too. The 3000 system looks like a processor with an associated set of disk and tape devices, but in a communications sense, it's got one pipe. The operating system is structured to take all of its I/O traffic from the feeder net to that pipe. So terminal traffic and PC traffic and wide-area traffic all go through that one pipe.

And the terminal controller not only handles terminal traffic, it has X.25 feeds so that PAD-attached terminals come in looking just like natively attached terminals to keep the class of service identical. Systems communications using X.25 is achieved through that pipe as well.

The XL comes with a distribut-

tions. They want timely access to information throughout the enterprise, regardless of where it is. They want transparency; they want the network to dissolve, to go away.

There are a lot of ways to do that. But the more you make the network disappear from the end user's viewpoint, the more complicated you make it from the system administrator's or network operator's viewpoint.

There's a lot of emphasis on the client/server model of computing in the industry today. How is that concept evolving?

I think we're moving into the next paradigm of computing beyond the client/server paradigm. Client/server generally has the connotation of a set of clients associated with one server. The notion of multiple servers is not prevalent, and the notion of multiple servers that are specific to a particular task is not exploited.

Most file, print and communications servers are primitive. They're foundation elements, but they're not a method of distributing the computing structures and tasks.

With the broker concept, you're controlling the connection, not the communications, between clients and servers. When a client wants a particular service, it makes an interrogation through the broker, and the broker routes it to the appropriate server. In its primitive form, this is a smart directory; but in its more extensive form, it can be a way of migrating tasks through different processors on a network and coupling clients with the server that is most suited to take on the next client.

It's not client/server computing, it's client/broker/server computing. Brokers allow for application-level transparency so that application developers don't have to be cognizant of what system an application is going to run on at the time they're writing the application. Through what's called a compiler process — even though it doesn't look anything

“The market is going to demand ISDN. But not until broadband ISDN arrives do I see it really providing significant value above other solutions.”

▲▲▲

ping now?

Yes. OpenView is three different things: It's a user interface platform, it's a series of applications, and ultimately it's a complete manager of managers underneath, behind the user interface.

So you see OpenView as a global manager of managers?

I see it providing the foundation for that, yes. When we unveiled OpenView, we probably made a marketing mistake that confused a lot of people. OpenView is really a comprehensive architecture for network management. But because the first product was OpenView Windows, most people think of OpenView as a user interface in MS-DOS.

The OpenView architecture includes a sophisticated window-driven user interface backed by an application processor, which could be the same system but in larger configurations will clearly grow up to something beyond a workstation. That application processor is where the MIB — the Management Information Base, or data repository — will reside. And that's where the center point is for the [Specific Management

The X.25 packet network is another object. You manage all the switches and PADs in that net as a single set, and one object manager controls the whole set.

Now, if you want to manage a network of 3000s and TCP transport with an X.25 network and inline T-1 multiplexers, that's where the manager of managers function shows up, and that's not all there yet.

What's the relationship of OpenView to LAN Manager?

LAN Manager isn't a manager in the network management sense. It's a series of application support services that encompasses what was there in the MS-Net and NETBIOS service set, and to greatly extend it, they add pipes and mail slots and so on. But it's not a network manager. I sometimes wish Microsoft [Corp.] didn't choose that term, because it has caused some confusion.

I don't see OpenView and LAN Manager as in conflict; I see them as providing two separate services. LAN Manager has a directory embedded in it, and you want that directory to be administered from a network manager center, but that's not a difficulty in link-

“Virtually every 3000 customer is going to be an OpenView user in another few months because we're using OpenView to manage the distributed terminal controller.”

▲▲▲

with it. Some people think of Ethernet as including [Advanced Research Projects Agency] services, [File Transfer Protocol] and so on. But we have a complete line of ARPA services available now for our Vectra personal computer and the HP 1000 and 3000.

There are similar subtleties inside TCP/IP. It has two modes —

ed operating system kind of structure, and the NCS structures are going to be embedded in there. The whole thing is on a network base. We really inverted the model from what we had before. The model then had a processor as the center of the universe and everything else bolted onto it. Now you have the network as a foundation element, and the pro-

like traditional compilers — you can more or less automatically link tasks across different systems. Then the person writing the application doesn't have to think about a multisystem model, just a multitasking model. So that makes the network transparent to him.

What are some examples of how the broker model can be applied?

The broker concept is embedded in NCS. The way you do a remote procedure call is through a broker that becomes a router of sorts. It's not a router in the sense of moving the traffic but in the sense of making the connection.

Here's another example of a problem the broker approach could solve. If you look at X.500 today, it only solves half the directory problem; X.500 becomes a repository of names and addresses. It's a very sophisticated directory, but if I'm trying to run a corporate mail system, I still have to join users to the system and give them a user profile, and that user profile is not part of the X.500 structure — it's part of the applications structure.

The X.500 standard is for interoperability, not for access. If users want to log on to HP DeskManager, to All-In-1, to [Professional Office System] or whatever, those applications are going to have some kind of a user profile that describes not only their class of service but where their data is stored. That's the access issue.

I am convinced that no vendor will ever provide a total solution.

I think that for a long time, system administrators are going to have to deal with the profile issue on a per-application basis as well as the directory issue. The reason for that is the profiles are embedded in the application.

But a broker is a very straightforward mechanism for providing a user profile that is application-independent. It could be used first for system access — are you joined to a system or are you joined to a network? And then as you start to access the system, your authorization and profile are checked, security verification is obtained and then you can access a particular system. So a broker is a way of controlling access as well.

One of the early applications for that is a license broker to manage software distribution. The license broker verifies if a particular user has authorization

to access a certain application and that the total number of users doesn't exceed the license limits and so on before they get you the application.

In doing the directory function, you don't negate anything that's in X.500, but this becomes an extension of it.

So I think the broker is probably one of the most powerful concepts in distributed computing that I've seen emerge in the last 10 years. It's every bit as powerful in the next generation of computing as distributed file systems are in the current generation.

What key issues are users overlooking today when it comes to the way they manage their networks?

What frustrates me is the naivete of some users in terms of their expectations, not in terms of their need or demand. I think customers want a unified net management system, and I don't have any difficulty with that.

The naivete is their willingness to believe that any single vendor can provide a total solution. I am absolutely convinced that no vendor, in our lifetime or beyond, will ever provide a total solution. As long as you have equipment and systems and applications coming from different suppliers, you're going to have different network management issues that will require different solutions.

There's not one single management center; you can construct such a thing in terms of an operations center, but no single machine will have all the applications and data resident on it to manage everything on the net.

The manager of managers will be there — that is, a second, integrating layer — but the single-vendor solution to manage everything is not going to happen.

I happen to believe that no single vendor can offer a total solution in the area of computing, either. As long as you have different computing solutions and applications coming from different vendors, you've got the problem of integrating the network management.

In theory, we could standardize on one application structure, but to gain such an agreement would probably take generations because it includes the data structures underneath, the command structures to the equipment and all the rest. You would probably never gain such an agreement because the range of things you want to manage and applications you want to provide are just too broad.

So when we talk to customers who recognize that they need an integrated network management solution, we tell them to think of the integration not in the sense of an implosion into a single point, but they need to accept the notion that it's distributed and that we are going to try to provide an integrating solution across the top. ■

Mission OSI

continued from page 40

nies agreed to develop "scalable servers," which would provide users with transparent migration from OS/2 servers to minicomputer servers as networks grow.

But the biggest deal so far was HP's purchase of Apollo in April for \$476 million. Most reports have focused on the immediate strength the move brought to HP in the workstation market. According to April figures published by San Jose, Calif.-based market researcher Dataquest, Inc., HP and Apollo together have 30.4% of the workstation market, while Sun has 28.4%.

Just as important was Apollo's strength in connectivity.

"I would say Apollo and Tandem [Computers, Inc.] have been at the forefront of networking for some time," says Infonetics' Spanier.

"When HP bought Apollo, they bought some of the best technical people and some of the best technology in the business," he says. Spanier cites Apollo's Unix experience as another reason for HP's interest.

How will HP fit Apollo's networking technology into its overall strategy? Most likely piecemeal, over many months.

"There's no question that HP will use the best bits and try to meld the technologies of Apollo into HP strategies," Spanier says. "I think there's a lot to Apollo's [Network Computing System] that makes it worthwhile; I would really be surprised if NCS didn't get incorporated into HP stuff along the line."

"NCS is a top priority on our list," Muns says. "Other parts of the Domain system are being considered in joint decisions between Apollo and HP. We see continuing the Domain system and the HP/UX system and starting the OSF system; those three strains of operating systems will coexist for several years."

Mark Lederhos, a spokesman for Apollo, says there are no plans for Apollo to drop any current products. He adds that two major Apollo offerings — the Domain networking system and NCS — have recently been enhanced.

Other alliances

In addition to the Apollo purchase, HP bought small start-up

Eon Systems of Cupertino, Calif., in January. HP renamed the company Intelligent Networks Operations and absorbed Eon's LanProbe network analysis product into its Colorado Springs-based Telecommunications Division.

LanProbe is an intelligent fault- and performance-management tool for distributed computing environments. It was seen as a good match for HP's network testing equipment and for future versions of the OpenView network management product.

In August 1988, HP acquired 10% of Milpitas, Calif.-based voice mail vendor Octel Commu-

The sheer size of the competition often leaves HP with the image of a market follower.

nications Corp. HP also bought the European distribution rights for Octel products. Initially, HP bought 5% of Octel's stock; it pledged to buy another 5% over 18 months.

The plan with Octel was to integrate voice and data into office systems products. According to representatives for both companies, users will have to wait roughly another year for products linking HP DeskMessenger EMail with Octel voice-messaging systems.

A quiet cohabitation

Three months prior to the Octel deal, HP entered into a major joint development project with Northern Telecom, Inc. The Corporate Networks Operation was formed by both companies to oversee product development.

The original premise of the project was interworking between HP's OpenView and Northern Telecom's Meridian Data Networking System as a base for corporatewide enterprise networking systems.

"It's still somewhat in the exploratory stage," HP's Emerson

explains. "We are developing an intelligent interface between our systems and Northern Telecom's SL-1 private branch exchange using their ISDN Application Protocol." He describes the end product as "an integrated voice/data application without putting all the voice/data processing in a single box."

According to Emerson, the difficulty is in providing the basic infrastructure that allows the system to logically associate the voice terminal, which is connected through a PBX, and the data terminal or personal computer, which is connected over a local-area network.

"The intelligent signaling link between the data world and the voice world is part of what's necessary to do this," he explains. "It allows an application from the data side to exercise control over the PBX."

Follow the leaders

HP's success with acquisitions and alliances highlights its inability to compete one-on-one with the top connectivity vendors — IBM, AT&T and DEC. Despite ambitious strategies and careful product development, the sheer size of the competition often leaves HP with the image of a market follower rather than a technological leader.

"We are a technological follower for established standards," Muns says. "We believe that we're a technological leader in adding value to those standards. Technological leadership becomes a user liability if it doesn't [produce] a standard."

Wendler sees HP becoming more and more of a force in the marketplace.

"In the last year, [HP has] caused significant enough pressure on DEC to force a change in DEC's strategy," he asserts. "Essentially, HP and Sun forced DEC to embrace Ultrix and Unix." He adds that this influence is part of HP's overall improvement.

"The company is definitely turning around," Wendler says. "There is a resurgence. They're making the right moves; they bet the company on RISC and Unix, and it turned out to be a good bet."

"They've got a very strong revenue base, very strong customer loyalty and a huge product transition into Unix and RISC," he says. "It's looking great." ■

Letters

continued from page 31

and continues to include, the use of a CSU (at a different location) *free of charge* for as long as we subscribe to its service.

In this case, why is it that what is good for the gander is not good for the goose? The fact that US Sprint does not manufacture the equipment should not give it the right to do exactly what it raises so much hell about AT&T doing.

Technically, I could choose US Sprint's service and have it inter-

face with an AT&T CSU; personally, I don't care whose CSU is used as long as it does the job it is intended to do.

As in the case of Service Corp. International, I would think that if users expect to "nearly double spending to \$4.2 million [annually] under the new contract," they would be entitled to free or reduced-price equipment.

It's like pricing the same car at two dealers. If one dealer has the model you want for \$10,000 but air conditioning and stereo are \$5,000 extra and the other dealer

has the same model with air conditioning and stereo for \$12,000, which would you buy?

In my opinion, the US Sprints of the world would gain more credibility if they stopped practicing law and focused on more important telecommunications issues.

After all, telecommunications is the business they willingly entered.

David Vinson
Telecommunications analyst
Printpack, Inc.
Atlanta

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Racal unit unites rival LAN worlds

continued from page 1

connectivity between users on the two network operating systems," Fennessey said. "Long-term, it lets me hedge my bets. I don't have to make a choice between NetWare and OS/2 LAN Manager until the future is clear."

Two modules

LMN Server consists of two software modules, according to Larry Bachman, Racal InterLan's LMN software development manager. The first module contains NetWare's Internetwork Packet Exchange (IPX) protocols, which are used to format data packets for transmission.

The second module is an LMN translator, which converts the NetWare core protocol packets — the filing protocols used by Novell to send data packets between file servers and workstations — into LAN Manager and OS/2 system calls, he said.

An LMN-based server, supporting interfaces to independent NetWare and LAN Manager local nets, will enable NetWare MS-DOS workstation users to log on to a LAN Manager server using NetWare commands, according to Richard Hinkus, a Racal InterLan product manager. NetWare users do not have to learn OS/2 commands.

The NetWare workstation redirector has a directory services function that maps file names, user locations and the name and physical address of each server on the network, then routes packets accordingly.

Problems plaguing links raise concern

continued from page 5

Deere & Co., echoed the complaints of several users who said they were upset by the ongoing difficulties.

"Obviously, this is very frustrating," he said. "You wouldn't plan on having these facilities if you didn't need them." Coopman said his firm's plans to use a dedicated circuit over the French leg of TAT-8 were put on hold by the series of outages and other difficulties with the cable.

For their part, AT&T officials dismissed the problems as teething pains associated with new technology.

"In almost every system that you put into the ocean, you will have something that some quality control person missed," said James Barrett, AT&T's deputy director of international engineering.

Barrett said AT&T is discovering and repairing most of the weak links found in the early days of operation. Once the kinks are worked out, service should continue for several years without major interruptions.

"These aren't what you'd call inherent design deficiencies," Barrett said. "You find them within the first year or so of operation and then, hopefully, you don't find them again."

Barrett also said AT&T plans to work with France Telecom to get the French leg of TAT-8 buried deeper in the ocean floor, beyond the reach of fishing nets.

Donald Kimberlin, who heads up Telecommunications Network Architects, a consultancy in Safety Harbor, Fla., said users should remain wary of undersea fiber-optic cables until carriers work out the kinks. "My advice to a user would be to not commit your entire network to these systems for at least another six months or so," he said. "For every new cable, you've got to expect a break-in period." ■

The LMN Server software, running as a service under OS/2, "listens" for NetWare requests. "As they arrive, they're translated into the OS/2 LAN Manager equivalents, processed and returned to the NetWare workstation users," Bachman said.

As initially released, OS/2 LAN Manager workstations cannot access files in NetWare servers. Racal InterLan does, however, offer a software utility called LMN Copy that comes bundled with LMN Server. LMN Copy enables LAN Manager workstation users to copy files from a NetWare server and have them sent to either the LAN Manager server or workstation, Henkus said.

"LMN Copy is the first step to providing the same type of file access to LAN Manager users that we're already giving to

NetWare users," Henkus said. Racal InterLan product managers declined to disclose a ship date for the product.

Johns Hopkins has been using LMN Server on an Intel Corp. 80386-based personal computer, configured as a server, to allow approximately 12 NetWare and 3Com Corp. 3+ Open users on separate networks to exchange files and electronic mail messages. "It works like a charm," Fennessey said.

The only downside is that it slows throughput, he said. "Since the LMN Server adds an extra layer of processing at the server, we have seen about 20% slower throughput." However, with applications such as E-mail that do not have to be processed in real time, it's not that noticeable, he added.

Since the software runs as a service un-

der OS/2 on the LAN Manager file server, network administrators will not have to install additional hardware or software on the NetWare file servers and workstations.

By contrast, Novell's NetWare Requester will include workstation and server software components.

The LMN Server is media-independent in that it can support both Ethernet and token-ring networks. The software is also interoperable with all hardware and software drivers that are compatible with NetWare and OS/2 LAN Manager systems.

LMN Server software requires an IBM Personal Computer AT with at least 4M bytes of memory, OS/2 Version 1.0, LAN Manager Version 1.1 and NetWare Version 2.0a or 2.15.

LMN Server software is shipping now and costs \$1,295. ■

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For a copy of the complete contest rules, or a list of winners, send a self-addressed stamped envelope to Communication Networks '90, P.O. Box 9171, Framingham, MA 01701.



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CNB7

NetView gets graphic interface, PBX links

continued from page 1

network management products available faster.

"I was hopeful IBM might take this approach," said NetView user Doug Weber, district manager of data networking technology at Southwestern Bell Telephone Co. in St. Louis.

"They don't have the time or the expertise to develop what customers need in the

wide-ranging network management area. They are going out to other companies to solve some of our network management issues," Weber said.

Visual interface

The graphical interface is NSI's Net-center Graphic Network Monitor (GNM). GNM runs cooperatively on an MVS mainframe and a DOS-based personal computer. The latter supports a graphical presentation component that includes Digital Research, Inc.'s Gem graphical user interface. Future versions will work with VM hosts, said Mark Knittel, systems manager for network management at IBM.

With GNM, a user can create maps depicting various levels of detail about a network, from a worldwide view down to a particular device, Knittel said. The product gives users a graphical view of where problems are occurring in a network.

It does not, however, include a feature that sifts through multiple alarms to determine the cause of a problem, although Hancock said NetView includes features to help with problem diagnosis and passes that information to the GNM.

Analysts said an alarm correlation feature would require a data repository, which Hancock said IBM will announce within the next two months. She also said IBM will work to enhance the NSI product.

"It's our intent to combine the work done by US West with our own development and add functions for our customers, including things like conformance with [Systems Application Architecture]," she said.

IBM has not yet announced pricing and availability dates for the product, but NSI charged \$39,500 for a single license.

PBX link

Complementing the announcement that it had finalized its PBX deal with Siemens AG, IBM broadened NetView support for other vendors' PBXs (see related story, page 1).

IBM said it will comarket Toronto-based TSB International, Inc.'s HubView/PC, a NetView/PC application that can forward alarms from PBXs to NetView and download software, said David Morris, vice-president of marketing for TSB. Among the PBXs it supports are Northern Telecom, Inc.'s SL-1 and SL-100; the IBM/Rolm Systems Division family, which includes the older Rolm Corp. CBX 8000 and 9000 plus the IBM/Rolm 9751; Siemens' SD-192; and the AT&T System 75 and 85.

IBM will fund TSB development of an OS/2 version of HubView/PC, which will support between four and eight PBXs. The DOS version supports one PBX, Morris said. The OS/2 version will also send call detail data to NetView, as opposed to just alarm and traffic data.

Although IBM pricing and availability was not disclosed, TSB sells the NetView/PC software for an average of \$10,000.

IBM may use some of those third-party products as part of its expanded customer network support, which will come in a variety of flavors, Hancock said. "We are open to all sorts of discussion as to the extent of control that the customer would like IBM to have," she said.

In another NetView-related announcement last week, IBM entered into an agreement with Carl Vanderbeek and Associates of San Juan Capistrano, Calif. whereby IBM will sell that company's menu-based application generator for developing NetView/PC applications. ■

Users fear delays as strikes continue

continued from page 2

William Cunnane, assistant commissioner for the office of network services, said the GSA is concerned that scheduled cutovers for the FTS 2000 telecommunications system could be delayed because of the strike.

While the initial cutover to the FTS 2000 network is planned for Oct. 6, a test run is scheduled to begin Sept. 11. The test will require help from technicians at the local Bell companies. FTS 2000 is expected to save the government \$100 million to \$200 million annually.

"We'll make a decision in the coming weeks and see if we need to modify our transition plans," Cunnane said.

Universities and research firms in New England were also concerned that expansion plans for the New England Academic and Research network (NEARnet) could also be delayed (see "Microwave technique extends E-net links," page 21).

According to John Rego, NEARnet account manager at Bolt, Beranek and Newman, Inc., the Cambridge, Mass.-based facilities operator for NEARnet, five new circuits including T-1, 56K bit/sec and 9.6K bit/sec lines will be added to the net, with one 56K bit/sec line scheduled to be installed this week.

Although New England Telephone and Telegraph Co. reassured Rego that installation of digital services is a priority and should be completed within a day or two of original schedule, "We'll see next week,"

Rego said.

Rego was concerned that even if NEARnet does not experience any installation delays, the perception of network-related problems due to the strike could dissuade companies from joining the network.

Dashed hopes

Union members met with Nynex officials for the first time last week since the walkout began, but hopes for a settlement were dashed when the meeting abruptly ended after union officials refused to give ground on health care benefits costs.

Nynex maintains the CWA agreed in its 1986 contract to pick up a portion of health care costs effective July 1, 1989, and "the union now refuses to accept what it agreed to." The CWA, however, disputes Nynex's interpretation of that contract and said health care cost-shifting is "as unacceptable to union members now as it was the day the strike started." No further discussions were scheduled.

CWA workers in the Ameritech region held no talks last week with company officials, although union members did meet to discuss strike strategy, a CWA spokesman said. "That implies we're focusing on coordinating and maintaining the strike, and not really talking about bargaining," he said.

Wages is the big issue with Ameritech CWA workers, the spokesman said. He called the financial package currently on the table "inadequate" and said the CWA would not return to the table until the Ameritech companies put new offers out. ■

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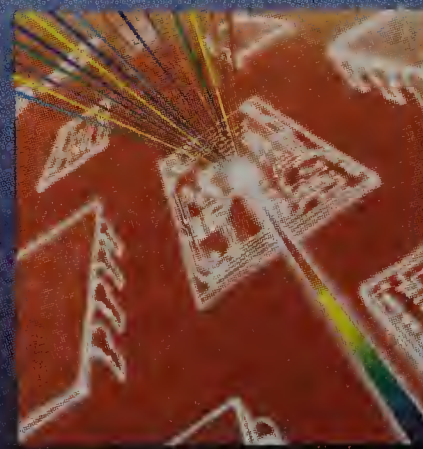
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AT&T Paradyne

McDonnell builds OSI network

continued from page 1

local networks. Overall, the network will support as many as 50 backbone nodes nationwide and link hundreds of processors and thousands of terminals, Gillerman said.

The architecture's top tier will be a wide-area digital network of T-1 and 56K bit/sec links connecting large intelligent communications processors. Gillerman declined to name the vendor that will supply the processors.

Each processor will be connected to one or more metropolitan networks — the architecture's second tier — via a high-speed link or a direct channel connection. The metropolitan networks will be token-ring nets supporting gateways to one or more local networks.

Each McDonnell Douglas site will have at least one metropolitan network. Large sites — such as the company's headquarters in St. Louis, which contains scores of local networks — will require two or more metropolitan networks to ensure adequate net response time.

The data flow

All data traffic flowing from one local network to another must pass through a metropolitan network. The metropolitan network will either pass the data to the attached local networks or to a node on the backbone network, which will then route it to another metropolitan net.

At the bottom tier of the architecture are local networks selected and supported by departmental users. Users are allowed to choose whatever local network they want as long as it's OSI-compatible or supports an interface to the OSI-based backbone.

The standards game

The use of standards will enable McDonnell Douglas to cut costs by reducing the number of

“It's conceivable we could migrate our entire network to ISDN,” Gillerman said.

▲▲▲

network links between sites, Gillerman said. Instead of installing a new circuit to link two local nets, McDonnell Douglas will establish connections simply by changing routing schedules in a metropolitan network or backbone node.

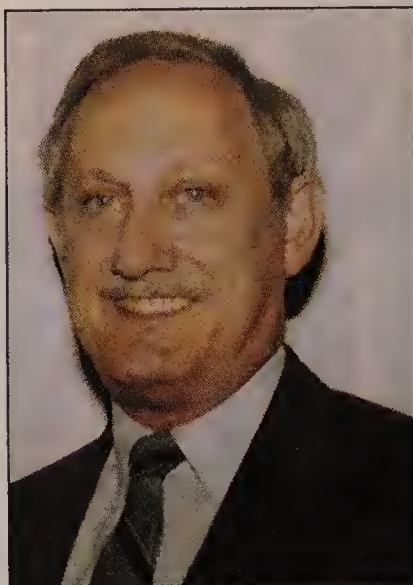
“This project is challenging and frightening, but we're betting that OSI and multitiered networks are where the communications industry is heading,” Gillerman said.

Standards also open the possi-

bility of adding a fourth tier to the architecture — an international network using OSI-based Integrated Services Digital Network standards.

“Should ISDN develop as some promise it will, it's conceivable we could migrate our entire network to ISDN and add compatible network nodes overseas,” Gillerman said.

A major benefit of the new architecture is that it will provide



McDonnell Douglas' Gillerman

greater protection against virus attacks and unauthorized network access, Gillerman said.

Currently, local networks at McDonnell Douglas are proliferating in a complex daisy-chain pattern that makes it difficult to isolate viruses and keep them from infecting the rest of the network. The multiple interconnections also mean changes made by

end users in one network can disrupt communications elsewhere on other networks.

By contrast, the new architecture forces all data to flow through a metropolitan network before entering another network, thereby creating a gateway that would enable the company to detect and isolate viruses before they spread.

“The architecture will prevent our networks from going down like dominoes, something that can easily happen when local networks are interconnected at multiple points instead of at a single point [where a gateway] can monitor and control the traffic flowing in and out,” Gillerman said.

Hurdles overcome

Gillerman said the architecture was not difficult to sell to the aerospace company's five operating divisions, even though it represented a radical departure from the company's existing network. The project gained widespread approval because Gillerman made sure a top network manager from each division was part of the planning group that formulated the architecture.

“Those managers had a vested stake in selling the concept to their divisions. If they weren't on board from the beginning, it might have been a much harder sell,” he said.

“We have been going slowly enough to do the job right,” he said. □

Calendar

Sept. 6-8, Anaheim, Calif. — UNIX Computing Conference & Show. Contact: Expoconsul International, Inc., 3 Independence Way, Princeton, N.J. 08540; (609) 987-9400.

Sept. 6-8, Arlington, Va. — Optical Information Systems '89. Contact: Meckler Corp., 11 Ferry Lane W., Westport, Conn. 06880; (203) 226-6967.

Sept. 7-8, Toronto — North American MAP/TOP Users Group Meeting. Contact: MAP/TOP Users Group, 2901 Hubbard St., Ann Arbor, Mich. 48106; (313) 769-4459.

Sept. 7-8, San Francisco — Management Issues in Electronic Data Exchange. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402; (213) 394-8305.

Sept. 10-13, New York — 21st Annual Information Industry Association. Contact: Information Industry Association, 555 New Jersey Ave., Suite 800, Washington, D.C. 20001; (202) 639-8262.

Sept. 10-14, New Orleans — NASTD 12th Annual Conference & Trade Show. Contact: National Association of State Telecommunications Directors, Iron Works Pike, P.O. Box 11910, Lexington, Ky. 40578; (606) 231-1876

Sept. 10-14, Waikola, Hawaii — ISDN '89. Contact: IEEE-ISDN 89, GTE Hawaiian Telephone Co., P.O. Box 2200, Honolulu, Hawaii 96841; (808) 546-2512.

Sept. 11-13, Santa Clara, Calif. — Technical Computing and Applications. Contact: Dataquest, Inc., 1290 Ridder Park Drive, San Jose, Calif. 95131; (408) 437-8000.

Sept. 11-15, Washington, D.C. — Open Systems Interconnection. Contact: Omnicom Institute, 115 Park St. SE, Vienna, Va. 22180; (703) 281-1135.

Sept. 12, San Francisco — OSF/MOTIF Seminar. Contact: Open Software Foundation, 11 Cambridge Center, Cambridge, Mass. 02142; (617) 621-8871.

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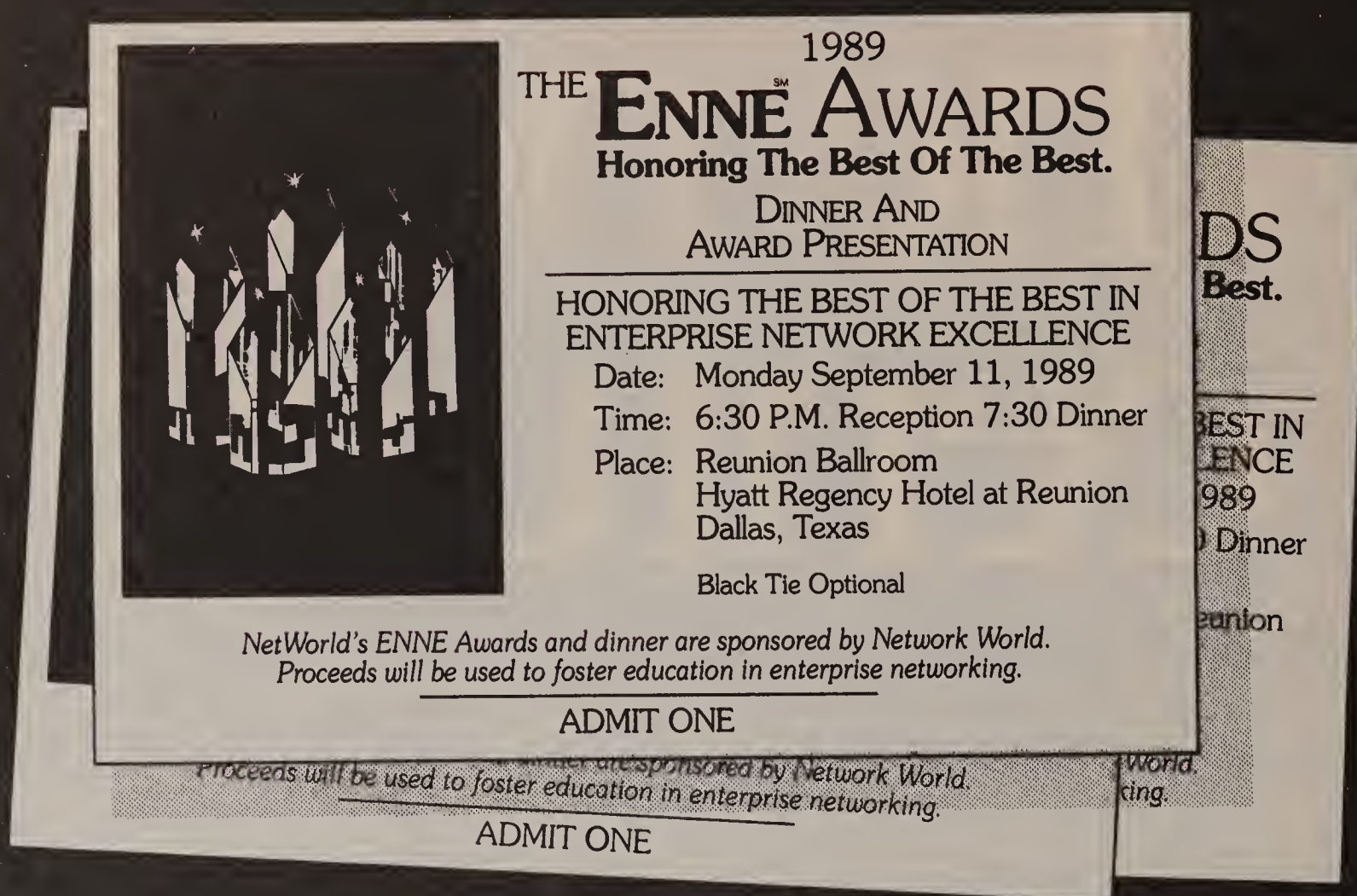
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The lowdown on high-volume terminal servers

BY DOMINIC LAITI JR.

VAX managers in the market for a Local Area Transport (LAT) terminal server that supports more than 100 users will find themselves comparing two alternatives: Digital Equipment Corp.'s DECserver 550 and Xyplex, Inc.'s Maxserver 5000. Both boxes have proven themselves to be viable solutions for network support of user terminals.

At 25 inches high, the DECserver 550 takes up about a quarter of the space it would take to service 128 ports with DECserver 200s — DEC's eight-port box that is currently the industry standard for these devices. The Maxserver 5000 is more space-economical with a height of only 10½ inches.

The need for speed

The DECserver 550, which can support as many as 128 users, was designed as a terminal server. Its function is just that — to serve terminals and printers. Xyplex took the idea a step further and designed the Maxserver 5000, which supports as many as 120 users, as a communications server. In addition to serving the basic communications needs of terminals and printers, the Maxserver 5000 also supports high-speed data input, multiple network interfaces and concurrent multiprotocol sessions.

Although both devices support port speeds up to 38.4K bit/sec, the DECserver 550 has a maximum input of 112K bit/sec, which — when fully loaded — is less than 900 bit/sec per channel. The reason for this is that in a terminal environment, users could not possibly reach this maximum by simply keystroking.

Many data centers have to support high volumes of data and accommodate continuous submissions from other local and remote processors that run at speeds from 1,200 bit/sec to 9.6K bit/sec and up.

The DECserver 550, however, would run out of gas quickly if it were used in such a manner.

The Maxserver 5000, on the other hand, accommodates input of up to 1,384K bit/sec — 12 times that of the DECserver 550. But if throughput on either product exceeds the defined maximum, the resulting throughput per port would diminish.

Single vs. parallel

Both products offer a substantial maximum output: 1,280K bit/sec for the DECserver 550 and 2,536K bit/sec for the Maxserver 5000. But while the DECserver 550 is based on a single processor, the Maxserver 5000 is based on

parallel processors. Each of the Maxserver's terminal cards has its own processor that accommodates one million instructions per second; hence, the performance of the box remains constant with high volumes of data traffic.

This architectural difference also gives the DEC product the edge when it comes to boot time. Because the DECserver 550 only has one processor, it appears to the VAX as just one address; therefore, it takes only a few seconds to boot up.

On the other hand, since each Maxserver card has its own unique address (there can be as many as 15), it may take a minute or more to boot. This can make a big difference with research and development systems that are often up and down.

Managers of centers with remote users should note that the Maxserver 5000 has a full complement of ports (120) with RS-232 modem control.

The DECserver 550 must have an eight-port card substituted for the 16-port one to provide this control. Obviously, this increases the price per port substantially, especially if there are a significant number of modem control requirements. The connection to the 16-port card supports communications up to 1,000 feet, an advantage to local user environments because it extends the area serviced by that local net.

Trouble-free

Keith Kidd, a communications engineer at Bell Atlantic Corp. in Richmond, Va., manages nine DECserver 500s — the predecessor of the 550 — and states that he has had less trouble with his DECservers "than with any other DEC hardware."

Al Phillips, communications manager at the Wayne Division of Dresser Industries, a large manufacturing firm in Salisbury, Md., has had Xyplex equipment installed for three years. "We have never had any trouble with the equipment," he says. In fact, every manager interviewed who has either the Maxserver 5000 or the DECserver 550 (or the 500) extolled the products' reliability.

Xyplex says it has engineered its product for the least amount of downtime possible, which should make managers feel more secure. The Maxserver 5000 can have a hot, on-line local network interface card backup that will take control if the main card goes bad. However, a terminal server card must be sacrificed to make this arrangement possible.

The Maxserver's terminal server cards are hot-swappable: A bad card can be extracted from its slot and a new one installed with no disturbance to communications on other cards. If swapped, the old card's configuration is automatically loaded onto the new card.

A redundant power supply can also be obtained for \$3,490. Therefore, maintenance can be done entirely in-house; the user mails the bad cards to Xyplex, and Xyplex sends a replacement back via overnight mail.

DEC, on the other hand, has not taken this approach with its DECserver 550. Customers must rely on DEC service or some other service corporation to resolve any hardware problems. If a terminal card goes bad, only the users on that card are affected, but they will be without service until the whole server can be brought down for repair. If the local network card goes bad, all users are affected.

Managers and network operators will be pleasantly surprised by the Maxserver's Network Management System. It does everything the DECserver can do and much more, and it does it all on well-designed display windows. "You'll throw out your LAT software when you get a look at what Xyplex can do," Phillips says.

In addition to recording network utilization, error rate data and individual

does what it was made to do. Many managers also like that it offers a single-vendor solution to their networking needs. Yet, with changing times come changing ideas, changing applications and changing networks. Network planners are well-advised to make sure the products they incorporate are as flexible as possible.

Xyplex seems to have taken this into consideration with the design of the Maxserver 5000. Its architecture not only supports the network's current needs but also can be adapted to meet future requirements.

Make that three alternatives

A recent arrival to the terminal server market is the Vista, manufactured by Datability, Inc. of New York, maker of Remote Access Facility software. The company only began shipping the product in February, so the jury is still out on just how well the Vista performs.

First impressions concerning the Vista are rather favorable though. It has a 5¼-in. design, its four expansion slots can hold cards that support as many as

How two servers stack up

Feature	Product	
	Xyplex, Inc.'s Maxserver 5000	Digital Equipment Corp.'s DECserver 550
Throughput-input	1,384K bit/sec	112K bit/sec
Throughput-output	2,536K bit/sec	1,280K bit/sec
Hot-swappable cards	Yes	No
Processor	Multiple	Single
Redundant logic and power	Yes	No
Multiprotocol concurrent	Yes	No
Warranty	3 years	Extra
Cost per port (maximum number of ports)	\$291	\$286

GRAPHIC BY SUSAN SLATER

SOURCE: INFOTECH DATA RESOURCES, VIENNA, VA.

port configuration and activity, the Xyplex software can diagnose communications quality between nodes. In addition, the software, which costs \$2,500, can run on different VAX/VMS hosts in the network at the same time.

Users who choose Xyplex's LAT Interface Card forfeit this luxury in network management and must rely on DEC's Terminal Server Manager (TSM) software. TSM does the job adequately, but it's like going from an electric mixer to a wire whisk.

Counting the cost

A fully loaded DECserver 550 runs about \$286 per port (\$36,679 for the unit); the Maxserver 5000 runs about \$291 per port (\$35,920 for the unit). In addition, the Maxserver 5000 comes with a three-year warranty on all parts and labor. DEC service and maintenance costs extra, which adds substantially to the DECserver 550's total (a minimum of \$170 per month).

The DECserver 550 is reliable and

128 users, and it can be rack-mounted.

The Vista's modular components can be tailor fitted for a variety of network configurations. The Ethernet network card comes standard with connectors for thick, thin and SynOptics Communications, Inc.'s unshielded twisted-pair cable.

The line cards come in a variety of flavors: an eight-port RS-232 (DB25) card, a 32-port RS-423 card, a 32-port RS-423 card with 50-pin telephone company connectors and an eight-port Hayes Microcomputer Products, Inc.-compatible modem card (2,400 baud). Each card comes with its own processor. The Vista also has a front panel and display to assist in server configuration and control.

A fully loaded Vista — 128 ports — costs about \$118 per port. Datability definitely has the right idea at the right price, and if all goes according to plan, the Vista could soon be the product to beat in the terminal server marketplace. ■

Laiti is data communications manager for Infotech Data Resources, a data processing and communications firm in Vienna, Va.

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Share resources.

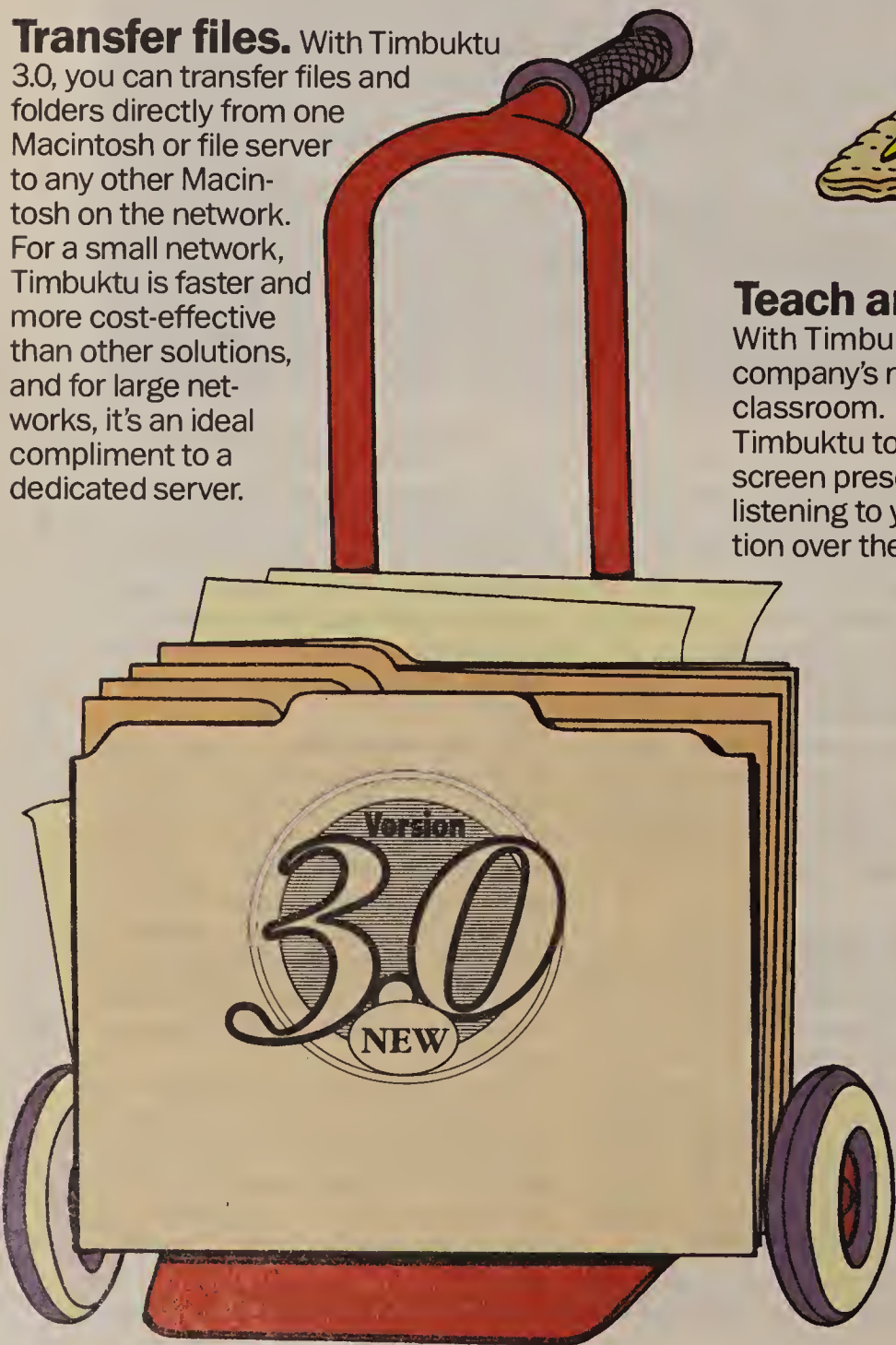
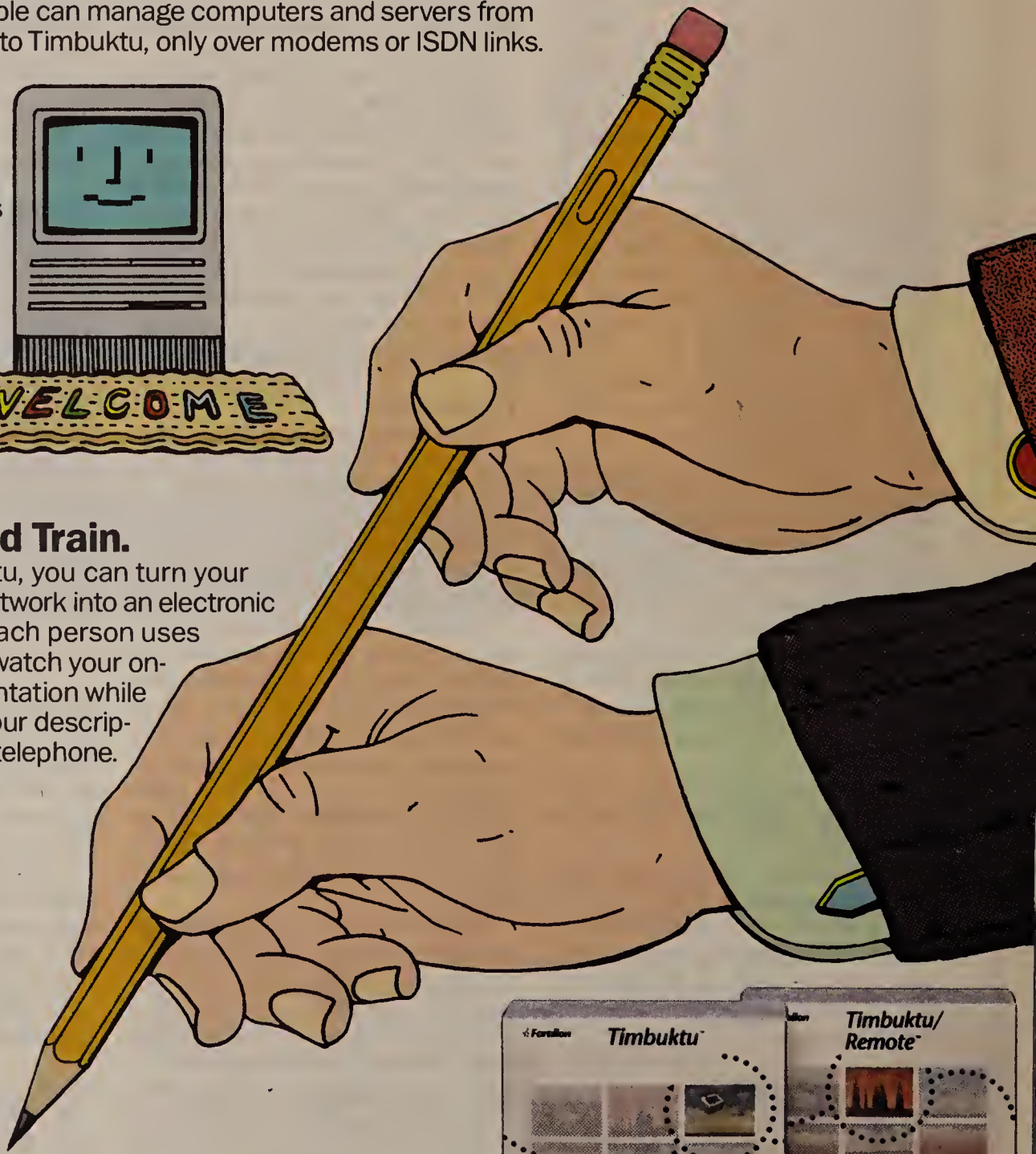
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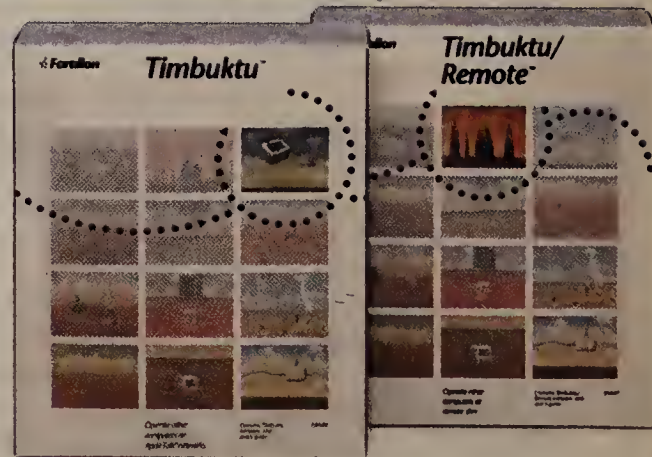
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